UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

E/C.7/1993/10
22 February 1993

ORIGINAL: ENGLISH

COMMITTEE ON NATURAL RESOURCES
First session
29 March-8 April 1993
Item 11 of the provisional agenda*

ISSUES CONCERNING THE INTERNATIONAL ROUND-TABLE ON MINING AND THE ENVIRONMENT, HELD IN BERLIN IN 1991, AND IMPLICATIONS OF ENVIRONMENTAL PROTECTION AND CONSERVATION POLICIES AND STRATEGIES IN THE MINERAL SECTOR

Conclusions and recommendations of the International Round-table on Mining and the Environment and of the United Nations Conference on Environment and Development

Report of the Secretary-General

SUMMARY

This report contains a review of the outcome of the International Round-table on Mining and the Environment held in Berlin in June 1991 and the recommendations adopted at the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992. In addition, it briefly touches on environmental issues related to the development of the mineral sector, principally in the developing countries. Mining-related environmental activities of the Department of Economic and Social Development are summarized. The report concludes by indicating some activities that could be undertaken to assist developing countries in achieving sustainable development in the mining sector.

---

* E/C.7/1993/1.

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 3	3
I. CONCLUSIONS AND RECOMMENDATIONS OF THE INTERNATIONAL ROUND-TABLE ON MINING AND THE ENVIRONMENT	4 - 11	3
II. IMPACT OF ENVIRONMENTAL POLICIES ON THE GROWTH OF THE MINING SECTOR	12 - 13	7
III. ENVIRONMENTAL CHALLENGES FACING THE MINING SECTOR AND FUTURE ACTION ENVISAGED	14 - 16	8
IV. SPECIAL CONSIDERATION OF THE RESULTS OF THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, WITH PARTICULAR REFERENCE TO AGENDA 21	17 - 28	9
V. ENVIRONMENTAL ASPECTS OF MINERAL DEVELOPMENT ACTIVITIES IN 1991-1992	29 - 30	12
VI. ENVIRONMENTAL ASPECTS OF MINERAL DEVELOPMENT ACTIVITIES PLANNED FOR 1993	31	13
VII. CONCLUSIONS	32	13

Annexes

I. The Berlin Guidelines 15
II. Studies/publications 18

INTRODUCTION

1. The present report has been prepared in response to Economic and Social Council resolution 1991/87. Pursuant to that resolution, the report includes the conclusions and recommendations of the International Round-table on Mining and the Environment held in Berlin in June 1991. It reviews the impact of environmental and conservation policies on the growth of the mining sector as well as the environmental challenges it faces and future action envisaged. Special consideration is given to the results of the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro in June 1992.

2. The International Round-table was organized jointly by the United Nations Department of Economic and Social Development and the Development Policy Forum of the German Foundation for International Development. Fifty-four participants from the Governments of developing and industrialized countries, environmental agencies, the international mining industry, international organizations and non-governmental organizations were present.

3. The objective of the Round-table was to contribute to the analytical and policy work on environmental issues affecting mining conducted by government bodies, mining companies, non-governmental organizations and development agencies. Developing and industrialized countries shared their expertise and experience with a view to developing a coordinated approach to the many environmental (including sociocultural and health-related) issues facing the industry. The meeting focused attention on ways of introducing environmental guidelines for use by developing country Governments, mining companies and bilateral and multilateral donor agencies in approving mining projects. The resulting Berlin Guidelines on the mining sector (annex I) are regarded as a very useful benchmark for approaching the implementation of Agenda 21 (A/CONF.151/26/Rev.1 (vol. 1)), which is a comprehensive programme of action adopted by Governments at UNCED and a blueprint for action in all areas relating to sustainable development from the present time into the twenty-first century.

I. CONCLUSIONS AND RECOMMENDATIONS OF THE INTERNATIONAL ROUND-TABLE ON MINING AND THE ENVIRONMENT

4. To meet its objective of contributing to the analytical and policy work on environmental issues related to mining, the meeting addressed the concept of long-term sustainable development of the mining industry and the national and international issues confronted by countries at different levels of industrialization. The main focus of the meeting was on the formulation of international principles, guidelines and national regulatory standards in respect of mining, with particular emphasis on developing countries, with a view to initiating a consultative process between the various parties involved, such as the mining industry and government agencies. The meeting reached a compromise on a set of environmental guidelines (see annex I). These guidelines, directed at developing country Governments, mining companies and multilateral and bilateral development agencies, were the most important outcome of the meeting.

5. A need for establishing international guidelines had been recognized as vital by Governments, international development agencies and international mining companies. The meeting discussed the requirement and mechanisms for better coordination and cooperation among and between bilateral and multilateral development agencies in respect of mining and environmental activities in developing countries. Two discussion papers prepared by the United Nations for the meeting made an important contribution to the initiation of such a consultative process.

6. The first paper, entitled "International development agencies, mining and environment in developing countries," provided input to the discussion on:

(a) Identifying how technical cooperation/development assistance should be undertaken to minimize adverse environmental consequences resulting from the exploration for, mining and production of minerals and metals in developing countries;

(b) Identifying needs and mechanisms for better coordination and cooperation among and between bilateral, regional and multilateral development agencies in respect of mining and environment activities in developing countries;

(c) Formulating environmental guidelines for mining in developing countries.

7. In preparing the paper, a number of development agencies had been requested to provide information about their own activities relating to mining and environment in developing countries. Specifically, those development agencies had been invited to furnish information both by way of case studies of specific projects and programmes as well as by way of agency policies, guidelines and practices in respect of mining and environment in developing countries. In addition, a number of environmental issues to be addressed in mining/metallurgical operations had been identified and development agency experience relating to such issues had also been solicited. Finally, the development agencies had been invited to furnish information on past research, analysis and meetings, future work programmes and agency recommendations relating to mining and environment in developing countries. This survey had helped to identify the activities of development agencies relating to mining and the environment in developing countries (objectives, methods, results), as well as to identify successful cases and methods, main obstacles and options for designing environmental projects in the mining sector in developing countries.

8. The second paper, entitled "Towards environmental guidelines on mining in developing countries", constituted a major initiative directed towards establishing specific environmental guidelines relating to different types of mining, the exploitation of specific minerals, and the different technological processes involved in extraction, bonification and processing. The paper drew on responses of the international development agencies, as well as on contributions from mining companies and national and international mining associations on their own policies and practices regarding the environmental aspects of mining. It was on the basis of these responses that draft environmental principles and guidelines had been put forward in the discussion

paper for the consideration of developing country Governments, mining companies and multilateral and bilateral development agencies. Those draft principles and guidelines had then formed the basis for the deliberations of the Working Group on Environmental Guidelines at the International Round-table on Mining and the Environment and had led to the guidelines being adopted by consensus in Berlin; they have come to be known in the mining industry as The Berlin Guidelines.

9. As indicated, the above-mentioned discussion paper had been prepared on the basis of responses received from mining companies. Written responses had been received from 13 companies (one each from Chile, the United Kingdom of Great Britain and Northern Ireland, the Netherlands and Finland; two each from Japan, Canada and Australia; and three from the United States of America). The seven areas in which information had been sought were the following:

(a) Availability of company guidelines on environmental protection;

(b) Importance of environmental protection in company strategy and planning;

(c) Costs of environmental protection for the various types of mining and metallurgical operations;

(d) Organizational set-up within the company for environmental protection;

(e) Competitive impact of different environmental protection standards in various countries;

(f) Special observations with respect to environmental regulations encountered in developing countries;

(g) Possibility of less stringent environmental standards in developing countries as a factor in the choice of where to locate mining and metallurgical operations.

10. The paper analysed the various corporate environmental guidelines and the role of environmental protection in company strategy and planning, and pointed to the difficulties in reporting the costs of environmental protection in mining and metallurgical operations. It also emphasized the importance of corporate organizational set-ups for environmental protection and reflected corporate views on the competitive impact of differing national environmental protection standards. Finally, it highlighted and addressed the following six key issues relevant to negotiations for adopting international principles and guidelines on environmental aspects of mining:

(a) Confidentiality and the right to know: there was repeated reaffirmation that environmental considerations must be taken into account at the earliest possible stage of mineral development activities. There were, however, needs for confidentiality that must be balanced against needs for public disclosure;

/...

(b) Costs of environmental compliance: despite mining company tact on the subject, there was no doubt that environmental costs were real and must be met collectively by mining companies, host Governments, development assistance agencies and consumers in developing countries. Mechanisms must be developed to meet the costs of both long-term pollution and short-term remedial environmental costs;

(c) Impact assessment and management programme: the monitoring and implementation of environmental guidelines were almost as important as the articulation of those guidelines. There were very important problems related to the above two management tools which all interest groups agreed were vital to effective environmental regulation. Serious practical questions existed with respect to the successful conduct of impact assessment and management programmes, such as who did the job, how costs were met and how the credibility of the process and its outcome, as well as participation and accuracy, could be ensured.

(d) Reconciling conflicting national priorities: environmental priorities (especially long-term) might often assume global but not national significance in developing countries faced with immediate concerns with regard to foreign exchange and revenue earning and employment. Development assistance agencies had vital roles to play in reconciling and adjusting such conflict in priorities;

(e) Reconciling conflicting interests: mining in developing countries involved an inherent and basic conflict between Governments (which wished to maximize economic return) and foreign mining companies (which wished to optimize profits). Environmental considerations must not be held hostage to such conflicts. Environmental mediation mechanisms and multilateral and bilateral development assistance agencies both had crucial roles to play in this regard;

(f) Participation by concerned and affected groups: many if not most of the problems arising from health, safety and environmental impacts on affected communities could be averted if significant, effective and early participatory mechanisms could be developed. Often, a foreign mining company became a scapegoat for a host Government which had opted to bypass meaningful local community participation procedures. This was a classic no-win situation which needed to be addressed by policies which did not fear or begrudge participatory processes.

11. The discussion paper underscored that:

(a) It was crucial not only to think in terms of adoption of principles and guidelines regarding the environmental impacts of mining in developing countries, but also to devise management tools and monitoring, implementing and sanctioning mechanisms in respect of such guidelines. Otherwise they would be guidelines honoured more in the breach than in the observance;

(b) International guidelines could only be introduced through an international process. Adoption of international guidelines by the Berlin Round-table, while an important first step, was part of a process that needed to evolve collectively and which would involve, at a minimum:

/...

(i) Continuing consultative and adoptive processes with mining companies/national industry associations; national and international trade unions; national and international environmental consumers, other public interest non-governmental organizations; and governments;

(ii) Adopting the guidelines within the United Nations system of environmental management relating to minerals resource projects.

II. IMPACT OF ENVIRONMENTAL POLICIES ON THE GROWTH OF THE MINING SECTOR

12. In recent years, growing environmental awareness worldwide among Member States and the United Nations has led to equally growing concern that industry generally, including mining, should be committed to land-use planning, mine-site rehabilitation, minimizing environmental pollution, utilizing clean production technology and curbing noise pollution. The enactment of environmental regulations has affected the mining sector and has modified attitudes from affirmative action to one of cautious investment. Recently, some conservation/preservation and anti-mining movements have been so active that pressure groups have been able to recommend to Governments the implementation of stringent regulations that may eventually freeze mining development.

13. The mining industry has responded to the new situation in a number of ways:

(a) It has showed a willingness to work within the framework of new and ever changing Government guidelines and has accepted that environmental protection is an area in which Governments must maintain a central role in implementing environmental regulations. Furthermore, it has become clear that well articulated environmental policies reinforce and enhance development opportunities;

(b) It has provided education on mining and the environment, which has helped to communicate to the public, Governments and educational institutions the important linkages between mining, the environment and the economy;

(c) It has demonstrated the importance of mining in increasing gross national product (GNP) leading to economic growth;

(d) It has contributed and continues to contribute to the development of new enhanced technologies in order to minimize environmental damage while maximizing production efficiency;

(e) Mining corporations are establishing their own mining standards with a view to:

(i) Preparing environmental impact assessments for all stages of mineral development from exploration through metallurgical processing to product use;

(ii) Designing projects to minimize environmental damage and optimize ore recovery;

(iii) Adopting and implementing adequate health and safety standards for mine workers;

(iv) Preparing and implementing mine-site rehabilitation programmes. The mining industry is a world leader in rehabilitation of disturbed lands and is developing waste-recycling technologies as productive activities; and

(v) Preparing and implementing an environmental management programme for post-operational phases of the mine project;

(f) It is facilitating the transfer of sound environmental technologies to developing countries, which will allow the implementation of modern and efficient mining methods. Those technologies should be compatible with both the search for profitable investment and the implementation of long-term environmental management;

(g) It is committed to undertaking environmental audit reviews which enable industry to assess whether the environmental performance at an existing mine is satisfactory. Auditing includes verification of regulatory compliance as well as evaluation of company organization to ensure that there is an adequate level of management control over environmental issues.

III. ENVIRONMENTAL CHALLENGES FACING THE MINING SECTOR AND FUTURE ACTION ENVISAGED

14. The challenge facing the mining sector is to develop and utilize environmentally friendly technology that is acceptable to Governments and meets the social aspirations of the community while reconciling the economic and commercial needs of the industry. This linkage between the social and economic aspects is expected to contribute to increased productivity and profitability of the mining industry. To meet these newly established environmental regulations and policies, the entire production process has been re-evaluated within the mining sector worldwide. Environmental management starts during the planning stage of a project to ensure that environmental management plans are in place at the beginning of a project rather than being added on afterwards. Moreover, in order to sustain development, it is desirable for the mining industry to operate in an environmentally sound manner. An environmentally responsible attitude must be generated at all levels of mining operations and among all persons involved in mining. Senior and middle management at mine sites must be made aware of the financial value of sound environmental quality control practices.

15. Land-use planning requires all potential use of the land to be taken into consideration. This includes traditional land ownership, national parks, forestry, agriculture, mining and tourism. Access to land for exploration and development of mining resources is a prerequisite for the mining industry. "Projects planned and implemented in cooperation with indigenous people can involve fewer adverse impacts and more benefits to local communities. There is

/...

also the greater likelihood that projects will proceed without costly interruptions, provided all parties negotiate in a constructive manner. Such participation can increase the financial returns to developing companies and enhance the social well being of local communities" (see E/CN.4/Sub.2/1992/54). Similarly, capacity-building, training, and employment of the local population (at all levels from mine workers to senior management) in mining projects is desirable in order for local communities close to mining projects to feel connected and fully a part of mineral resource development. This will achieve clear social and economic objectives.

16. Equally important are the commercial benefits of treating mine wastes as a resource and the recycling of mineral products which will minimize the levels of pollution. Examples include the re-treatment of mine tailings for further extraction of precious metals and the use of final tailings material for the manufacture of building aggregate. Treating traditional waste products as a resource must be given proper importance. An alternative to the containment of mine tailings in retention systems warrants investigation. For example, the use of tailings as a resource to manufacture commercially lightweight building and road aggregate requires further research, while the collection of emission gases offers commercial alternatives to the traditional release of the gases to the atmosphere. The design of future mineral projects should take into account the minimization of adverse environmental impacts. This objective should be viewed as sound business policy, since competitive advantage will be increasingly derived from superior environmental performance.

IV. SPECIAL CONSIDERATION OF THE RESULTS OF THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT, WITH PARTICULAR REFERENCE TO AGENDA 21

Background of Agenda 21

17. In 1972, the United Nations convened the Conference on the Human Environment held in Stockholm. This Conference produced a set of principles for ecologically sound management of the planet and inscribed the environment firmly and irrevocably on the world agenda. Discussion took place for the first time, at a global level, about a kind of development that could be both environmentally sustainable and economically progressive. This kind of development would meet present needs without compromising the ability of future generations to meet their needs. Since then, concern has been mounting over the continued deterioration of the environment and lack of adequate measures to rectify such a development. Global environmental deterioration has been a result of unsustainable patterns of certain kinds of consumption and production processes, especially in the industrialized countries, which are responsible for the largest proportion of the current emission of pollutants, including toxic and hazardous wastes.

18. Between 1972 and 1987, following the Stockholm Conference, a series of more specialized United Nations conferences dealt with particular aspects of the environment; they included the United Nations Conference on Desertification (Nairobi, 1977); the United Nations Water Conference (Mar del Plata, 1977); the United Nations Conference on Science and Technology for Development (Vienna, 1979); and the United Nations Conference on New and Renewable Sources of Energy

/...

(Nairobi, 1981). During this period, however, much more remained to be done. It was necessary to integrate, in practical terms, concerns for development within the context of the environment in economic planning and decision-making. Progress was made in specific instances, but overall the environment of the planet deteriorated; ozone depletion, global warming, and other major environmental problems grew more serious.

19. In 1987, the United Nations World Commission on Environment and Development, with the publication of Our Common Future (widely known as the Brundtland Report), recognized the relationship between economic development and environmental impact. This landmark report convincingly documented the need for sustainable development in both industrialized and developing countries. The Brundtland Report also stated that the vastly different conditions under which countries must make the transition to sustainability impose special handicaps on the poor and place special responsibilities on the rich.

20. In December 1989, the United Nations General Assembly resolved to convene a United Nations Conference on Environment and Development (UNCED), which was held in Rio de Janeiro in June 1992. In calling for UNCED, Member States had stressed that poverty and environmental degradation were closely interrelated and that environmental protection in developing countries had to be viewed as an integral part of the development process. They had also stressed the need for effective international cooperation in researching, developing and applying environmentally sound technologies and had recognized that this global effort would require a supportive international economic climate conducive to sustained economic growth and development in all countries.

Agenda 21

21. In response, UNCED formulated an action plan for the 1990s and beyond the twenty-first century, commonly known as Agenda 21 (A/CONF.15126/Rev.1 (Vol. 1)), which would provide the basis for a global partnership for sustainable development and environmental protection throughout an increasingly interdependent world. For this global partnership to be effective, it must be accompanied by new levels of cooperation between all key sectors of society and Government. Agenda 21 is addressed to Governments, the agencies, organizations and programmes of the United Nations system, other intergovernmental and non-governmental organizations, constituency groups and the public at large, which must all be involved in its implementation, and covers a series of themes, each of which reflects an important dimension of the overall strategy for a global transition towards sustainable development.

Efficient use of natural resources

22. One of the major themes of Agenda 21 deals with the efficient use of natural resources and comprises action programmes focusing on the urgency to reverse the destruction of renewable resources and to implement an integrated approach to the planning and management of natural resources (soils, minerals, water and biota). As stated in chapter 10 of Agenda 21, entitled "Integrated approach to the planning and management of land resources", the broad objective is:

/...

> "to facilitate allocation of land to the uses that provide the greatest sustainable benefits and to promote the transition to a sustainable and integrated management of land resources. In doing so, environmental, social and economic issues should be taken into consideration. Protected areas, private property rights, the rights of indigenous people and their communities and other local communities and the economic role of women in agriculture and rural development, among other issues, should be taken into account" (para. 10.5).

Wastes

23. The use of natural resources and their production processes necessarily generate waste. There has been an increase in the amount of residues which are not being reintegrated into the ecosystem, causing considerable problems for human health and environmental quality. The volume and complexity of waste generation and its composition have also changed substantially over the years. Reducing waste generation, recycling wastes into productive activities, finding safe ways to dispose of the wastes that remain and dealing with illegal trade in hazardous wastes are all essential to managing chemicals and waste.

24. Agenda 21 makes specific proposals regarding: (a) environmentally sound management of toxic chemicals, including the prevention of illegal international traffic in toxic and dangerous products; (b) environmentally sound management of hazardous wastes, including the prevention of illegal international traffic in hazardous wastes; and (c) environmentally sound management of solid wastes and sewage-related issues. The present report analyses in chapters I and II the issue of hazardous waste in the mining sector.

25. Finally, the Conference of Plenipotentiaries on the Global Convention on the Control of Transboundary Movements of Hazardous Wastes, which was convened in Basel in March 1989, clearly indicated that "part of the transboundary movement of hazardous wastes and other wastes is being carried out in contravention of existing national legislation and relevant international legal instruments, as well as internationally accepted guidelines and principles, to the detriment of the environment and public health of all countries, particularly of developing countries" (resolution 4).

Capacity-building

26. The ability of a country to make the transition to sustainable development is dependent to a large extent on its endogenous institutional and professional capacity. Strengthening national capacity to react and plan on environmental matters is a central element of all Agenda 21 programmes. Support for institutional and normative frameworks for environmental policy formulation and management is essential. Countries must also develop the capacity to assimilate appropriate technologies and tap into global cross-flows of relevant knowledge and information. The corollary is not only sustained domestic commitment by developing countries, but new levels of commitment and support by the international community as a whole.

/...

Environmentally sound technologies

27. Environmentally sound technologies are fundamental to the transition to sustainable development. Pollution abatement and recycling technologies are essential ingredients of sustainable development. The developed countries have over time built up a substantial base of scientific and technological knowledge. This should be shared with the developing world to ensure a sound transition to environmentally sound and sustainable development. At the same time, the indigenous knowledge and cultural heritage of developing countries must be integrated with modern knowledge and technology to ensure a viable transition to more sustainable lifestyles and more responsible use of the Earth's resources.

28. In conclusion, Agenda 21 will be under constant review by the Department of Economic and Social Development and many other units of the United Nations for many years to come. The review already made constitutes the beginning of a long dialogue pursuant to UNCED accomplishments and in relation to their specific impact within the field of mining.

V. ENVIRONMENTAL ASPECTS OF MINERAL DEVELOPMENT ACTIVITIES IN 1991-1992

29. Prime operational functions of the Department of Economic and Social Development are to assist Governments of developing countries, at their request, in managing their mineral resources in an environmentally sound manner. Future activities will take into consideration the Basel Convention, the Berlin Guidelines and the UNCED recommendations.

30. At the operational level, environmental considerations were a major concern of mineral development activities in 1992, which led to the recruitment of an environmental interregional adviser whose expertise would strengthen the programmes which had already been initiated, such as (a) formulating a new project for assistance in Guinea-Bissau for the sound development of a phosphate deposit and the evaluation of additional mineral potential; (b) supervising the development, in the Dominican Republic, of the Pueblo Viejo mine along safe environmental guidelines; (c) undertaking environmental and geotechnical studies in Nepal, Pakistan and Thailand; and (d) launching two organizational workshop activities scheduled for 1993. In addition, advisory services were provided to Governments for the definition of environmental policies and the establishment of mining regulations and technical expertise related to the environment was provided to several countries; including Burkina Faso, Colombia, Chad, Ghana, the Philippines, Sierra Leone, Solomon Islands, Ethiopia, Mozambique, the Niger, United Republic of Tanzania, Namibia and Zambia.

/...

VI. ENVIRONMENTAL ASPECTS OF MINERAL DEVELOPMENT ACTIVITIES PLANNED FOR 1993

31. Similar environmental activities and advisory services will be carried out in 1993 by the Department of Economic and Social Development, in a gradually evolving manner, to help Governments to reshape mining activities as they affect the environment. A few key projects are briefly described below:

(a) In collaboration with the United Nations Environment Programme (UNEP), the Interregional Workshop on Environmental Management at Mining Sites in Developing Countries, scheduled for the third quarter of 1993 in Zambia, aims at strengthening the environmental management capacities of officials in charge of operating and regulating mining operations, with emphasis on environmental impact assessment (EIA) and water pollution control, and gathering data towards the preparation of a comprehensive manual on the environmental management of main mining operations in developing countries;

(b) The Workshop on Environment Management System, scheduled for September 1993 in Namibia in collaboration with the Carl Duisberg Gesselschaft (CDG) of Germany and oriented towards Southern African Development Community (SADC) countries, aims at developing a stronger emphasis on the environmental aspects of mining activities. Participants will learn how to carry out EIA and to apply environmental management guidelines (EMG) when starting and implementing mining projects, as well as the general framework for their practical application. In addition to the above-mentioned training projects, the Department of Economic and Social Development will continue providing institutional building assistance. Several developing countries have requested advisory services for tackling site-specific environmental problems and defining environmental policies in the framework of the general improvement of their investment climate.

VII. CONCLUSIONS

32. As a means of achieving sustainable development of mineral resources, the United Nations is giving consideration to inviting industry, Governments, national communities and non-governmental organizations to be part of the process of policy formulation and review. In many regions, there is scope for a review of the interaction between the mining sector and Governments. The United Nations could act as a facilitator to Member States to discuss the potential for exploration and development of new mining projects and the financial resources available for developing countries. Such initiatives by the United Nations at the international level could help bridge the communications gap between industry and developing country Governments and encourage private industry to invest in developing countries. In 1991 and 1992, the United Nations has been instrumental in facilitating the dialogue between the mining industry and Governments and this role could be further expanded towards activities aiming at:

(a) Developing international environmental awareness as well as a better understanding of the specific limitations and needs of the mineral sector in order to integrate it more fully in the sustainable development process;

/...

(b) Designing and implementing sensible and applicable government policies that are acceptable to all parties;

(c) Preparing a standard environmental assessment framework for all interested Governments, in particular for developing countries, which will include land-use planning, exploration, mining and metallurgical operations, rehabilitation, recycling and waste disposal;

(d) Using, developing and transferring mining and metallurgical technology that reduces environmental degradation;

(e) Improving the social, health and education opportunities of indigenous people in mining areas;

(f) Creating and implementing mining industry employment throughout entire mineral operations;

(g) Encouraging the rehabilitation of formerly mined lands for sustainable, recreational and agricultural pursuits;

(h) Evaluating mineral resources along with rural development to complement and improve sustainable living standards;

(i) Fostering investment in the developing world to increase its chances of success by encouraging Governments to create an investment climate that is hospitable to environmentally sound activities.

/...

Annex I

THE BERLIN GUIDELINES

Worldwide long-term economic development can best be achieved through the pursuit of sustainable development policies comprising a balance of economic, socio-cultural and environmental protection measures. While taking into account global environmental concerns, each country should apply this concept to meet the needs of its environment and economic circumstances.

Sustainable mining requires good environmental stewardship in all activities, from exploration and processing to decommissioning and reclamation. It acknowledges the importance of integrating environmental and economic considerations in the decision-making process and the fact that the mineral deposits are unique in their occurrence. It recognizes the importance of mining to the social, economic and material needs of society, particularly for developing countries, and that minerals, notably metals, offer great potential for the use of future generations through increased recycling programmes.

Sustainable mining under appropriate environmental guidelines is based on interaction between industry, Governments, non-governmental organizations and the public directed towards optimizing economic development while minimizing environmental degradation. The need for such guidelines is recognized by industry, Governments and international agencies. It is also recognized that the political will of Governments, together with the commitment of industry management and of the community, are the essential conditions needed to enforce environmental legislation and, more importantly, to ensure compliance with all applicable laws for the protection of the environment, employees and the public.

Addressed to the mineral sector

Governments, mining companies and the minerals industries should as a minimum:

1. Recognize environmental management as a high priority, notably during the licensing process and through the development and implementation of environmental management systems. These should include early and comprehensive environmental impact assessments, pollution control and other preventive and mitigative measures, monitoring and auditing activities and emergency response procedures;

2. Establish environmental accountability in industry and Government at the highest management and policy-making levels;

3. Encourage employees at all levels to recognize their responsibility for environmental management and ensure that adequate resources, staff and requisite training are available to implement environmental plans;

4. Ensure participation of and dialogue with the affected community and other directly interested parties on the environmental aspects of all phases of mining activities;

5. Adopt best practices to minimize environmental degradation, notably in the absence of specific environmental regulations;

6. Adopt environmentally sound technologies in all phases of mining activities and increase the emphasis on the transfer of appropriate technologies which mitigate environmental impacts, including those from small-scale mining operations;

7. Seek to provide additional funds and innovative financial arrangements to improve environmental performance of existing mining operations;

8. Adopt risk analysis and risk management in the development of regulation and in the design, operation and decommissioning of mining activities, including the handling and disposal of hazardous mining and other wastes;

9. Reinforce the infrastructure, information systems service, training and skills of environmental management in relation to mining activities;

10. Avoid the use of such environmental regulations that act as unnecessary barriers to trade and investment;

11. Recognize the linkages between ecology, socio-cultural conditions and human health and safety, both within the workplace and the natural environment;

12. Explore long-term mining investment by having clear environmental standards with stable and predictable environmental criteria and procedures.

Addressed to development assistance agencies

Multilateral and bilateral assistance agencies have an essential role to play in furthering environmental management, particularly in assisting developing nations with programmes to protect their environment, both nationally and as part of the global environmental system. Accordingly, they should:

1. Accord high priority to the mitigation of environmental degradation associated with mining in developing countries to achieve high environmental performance;

2. Initiate, as an integral part of any exploration and mining project, environmental institutional building programmes. Special support should be given to countries actively working to improve their environmental capabilities;

3. Require that all mining projects supported shall contain a training component that will include specific training on environmental awareness and its application to the mining sector;

4. Support increased research regarding the development of new processes with fewer environmental impacts, including recycling;

5. Support the development of activities that would mitigate adverse effects on the socio-cultural fabric and the ecosystem. To achieve this objective, international agencies should give priority to education and training which increase awareness of these issues and allow the affected communities to participate in decision-making;

6. In supporting mining projects, agencies should also take into account the following:

(a) Rehabilitation of displaced populations;

(b) Environmental history of the country;

(c) Large-scale impact on socio-cultural patterns;

(d) The overall economic balance of the project vis-à-vis its total environmental impact;

(e) The impact on other natural resources and ecologically sensitive areas, such as protected forest lands mangroves, wildlife parks and neighbouring watersheds;

7. Promote conferences and policy research on environmental management practices and technologies, and ensure the dissemination of this information;

8. Support and promote regional cooperative programmes to achieve sustainable development of mineral resources;

9. Adopt environmentally safe methods of mining and processing for existing projects;

10. Increase and coordinate their assistance to developing nations in the field of environmental policies management.

Annex II

STUDIES/PUBLICATIONS

A. Report on transnational corporations and industrial hazards disclosure

The Economic and Social Council, in resolution 1989/25, requested studies on ways developing countries might benefit from the experiences of other countries in their efforts to protect the environment in relation to the activities of industry including transnational corporations. In response to that request, the Department of Economic and Social Development prepared a report entitled "Transnational corporations and industrial hazards disclosure". a/ The report examines the regulatory schemes for the disclosure of environmental and health-risk information in industrialized countries. The report includes four drafts of model legislation for information disclosure that could be enacted in developing countries, covering: (a) plans for the construction of a major industrial facility; (b) the operation of an industrial facility that endangers public health, safety or the environment; (c) the sale or export of products that endanger product users, other persons or the environment; and (d) the management of a workplace that endangers the health and safety of workers and independent contractor personnel. b/

B. Benchmark corporate environmental survey

This survey, c/ undertaken on the basis of Economic and Social Council resolution 1990/71, investigates measures that would encourage and mobilize transnational corporations to protect and enhance the environment in its relationship to development. The survey describes the current state of international corporate environmental management and documents the most advanced corporate environmental practices. The four related reports deal with:

Report 1: atmospheric protection; protection and management of land resources; conservation of biological diversity; environmentally sound management of biotechnology;

Report 2: protection of oceans; protection of fresh water resources; environmentally sound management of toxic wastes and chemicals;

Report 3: legal and institutional matters;

Report 4: findings relating to general environmental management issues.

Notes

a/ Environment Series No. 1, ST/CTC/111 (United Nations publication, Sales No. E.91.II.A.18).

b/ Information disclosure is the centre-piece of the major environmental protection regulations in the United States of America and in the European

/...

Notes (continued)

Community countries. Information disclosure enables government officials to plan safety, regulate industrial activities, control the use of hazardous products and prepare contingency plans for responding to accidents and other harms. Disclosure is also important in educating the worker, product user and community resident to take self-protective measures and to contribute to risk-decision and emergency planning. Disclosure may independently stimulate firms to take voluntary initiatives to reduce risk.

c/ Consolidated Executive Summaries, ST/CTC/SER.C/5, forthcoming United Nations publication.

UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

E/C.7/1993/11
19 February 1993

ORIGINAL: ENGLISH

COMMITTEE ON NATURAL RESOURCES
First session
29 March-8 April 1993
Item 12 of the provisional agenda*

SMALL-SCALE MINING ACTIVITIES IN DEVELOPING COUNTRIES AND NATIONAL LEGISLATION REGARDING ENTERPRISES IN THIS AREA

Recent achievements in small-scale mining activities in developing countries

Report of the Secretary-General

SUMMARY

The present report has been prepared in response to Economic and Social Council resolution 1991/87 on trends and salient issues in the development of mineral resources. It discusses recent achievements, with emphasis on national legislation, progress in technology transfer and international cooperation, fostering of entrepreneurship, the integration of rural regions, and information on the economic contribution of women in small-scale mining.

The report describes achievements in the developing countries in the small-scale mining aspects of artisanal and small mechanized mining as well as marketing and financing. It addresses the role of informal mining as a safety-valve for the social implications of structural adjustment, especially in the developing countries, and the need to upgrade the subsector and foster entrepreneurship. The report also considers the legal aspects of small-scale mining because many countries have now adopted legislation regarding activities in this area. The question of transfer of technology to small miners is also considered in so far as it relates to demonstration projects

---

* E/C.7/1993/1.

and training programmes, available sources of technology and the role of equipment suppliers and manufacturers. The promotion of the development of small-scale mining and the role of marketing are stressed in view of their importance in rural development and as a source of income to improve standards of living.

The need for cooperation from the private sector and the international community is also discussed. The chapter on the contribution of women in small-scale mining examines constraints to the participation of women and the important impact women's activities have on the environment. Finally, environmental concerns are addressed in relation to legal and social aspects, cost implications in mining development, and the technology available to mitigate their effects. Funding, especially international sources of funds, to carry out these activities are discussed.

/...

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 4	5
I. RECENT ACHIEVEMENTS IN SMALL-SCALE MINING	5 - 29	6
A. Artisanal mining	5 - 16	6
B. Small mechanized mining	17 - 20	9
C. Marketing and financing	21 - 29	9
II. TRANSFORMATION OF ARTISANAL OR INFORMAL MINING	30 - 70	12
A. Role of informal mining as a safety-valve for structural adjustment	38 - 43	14
B. Basic technical, technological and financial requirements for transformation to commercial process	44 - 45	15
C. Role of foreign capital or entrepreneurship in development of small commercial sector	46 - 53	16
D. Fostering entrepreneurship: fashioning and supporting constructive relationships between domestic and international concerns	54 - 64	18
1. Market-centred	55 - 58	18
2. Technology and capital-centred	59 - 64	19
E. Role of Government	65 - 70	20
III. RECENT NATIONAL LEGISLATION	71 - 80	22
IV. TRANSFER OF TECHNOLOGY THROUGH DEMONSTRATION PROJECTS AND TRAINING	81 - 108	24
A. Recent demonstration projects	82 - 89	25
B. Training programmes and opportunities	90 - 97	27
C. Sources of technology for small-scale mining	98 - 102	29
D. Role of equipment suppliers and manufacturers	103 - 108	31

/...

CONTENTS (continued)

		Paragraphs	Page
V.	PROMOTION OF SMALL-SCALE MINING	109 - 133	32
	A. Importance of small-scale mining in rural development, improvement of living standards and distribution of income	109 - 112	32
	B. Markets and marketing	113 - 116	33
	C. National approaches	117 - 120	34
	D. International cooperation - private sector	121 - 123	36
	E. Role of the international community	124 - 133	37
VI.	CONTRIBUTION OF WOMEN IN SMALL-SCALE MINING	134 - 161	40
	A. Present role of women	134 - 143	40
	1. Artisanal mining	138 - 140	41
	2. Semi-mechanized mining	141 - 143	41
	B. Constraints to the participation of women	144 - 148	42
	C. Women and the environment	149 - 150	43
	D. National policies for future action	151 - 158	44
	E. Proposals for international cooperation	159 - 161	46
VII.	ENVIRONMENTAL CONSIDERATIONS	162 - 182	47
	A. Legal and social considerations	162 - 170	47
	B. Cost implications in mining development	171 - 173	50
	C. Technology available	174 - 178	51
	D. International funding sources	179 - 182	52
VIII.	CONCLUSIONS	183 - 195	53

/...

INTRODUCTION

1. The present report has been prepared in response to Economic and Social Council resolution 1991/87, paragraph 5, on trends and salient issues in the development of mineral resources. More specifically, the report addresses an explicit request for information concerning recent achievements in small-scale mining activities in the developing countries, national legislative initiatives related to small-scale mining, with particular emphasis on artisanal mining in progress in terms of demonstration projects and training, and national and international efforts to strengthen the sector, as well as basic data on the role of women in small-scale mining. It is important to note that most metallic and non-metallic minerals are amenable to small-scale mining.

2. The report attempts to assess progress in the field since the previous report, entitled "Small-scale mining prospects in developing countries: a review of recent activities" (E/C.7/1991/5), which was submitted to the Committee on Natural Resources at its twelfth session, in March/April 1991. That report reviewed in general terms recent activities in the field, including instructive case-studies, and discussed selected policy options available at the national, regional and international levels to promote this segment of the extractive industry. It concluded that the systematic and controlled mining of numerous small deposits can make significant contributions to the national, economic and social objectives of the developing countries. Regularization of activities through formal organizational structures, provision of financing and introduction of realistic marketing mechanisms, use of appropriate technology and managerial assistance, and continued aid by international agencies, while protecting the environment, could improve the performance of the mining sector and stimulate its growth. While offering these conclusions as a basis for discussion by the Committee to delineate future priority areas, the report suggested that the Committee might wish to keep under review the experience gained through technical cooperation activities and monitor the progress achieved by countries in this sector.

3. As at 1991, of the many countries in which small mines were operating, either formally or informally, only a few had comprehensive, efficient and totally satisfactory administrative or policy frameworks in place. Some countries were only beginning to recognize the desirability of developing and implementing an explicit and coherent plan of action. Others were preparing to modify, even restructure, existing institutions and policies, while some were content to maintain what was already in place. Still others remained ambivalent, not sure whether small-scale mining should be encouraged or outlawed, and not ready to commit any significant resources to dealing with its myriad problems.

4. The present report attempts to bring together the accumulated experience of the past few years vis-à-vis small-scale mining in various parts of the developing world. Where recently there might have been little of substance to

report, a variety of initiatives concerning legal and administrative frameworks, demonstration projects and training programmes, financial and technical assistance, technology and equipment development, and institution building specific to the sector have been taken at the local, national, regional and international levels with varying results. The pace and extent of progress have been more rapid in some countries than in others. The importance of policies for actions related specifically to women, which are so tied to the development of the subsector as a whole, is stressed.

I. RECENT ACHIEVEMENTS IN SMALL-SCALE MINING

A. Artisanal mining

5. Artisanal mining continued to be widely practised in certain countries of Asia, Africa, Latin America and the south-west Pacific. Only rough estimates exist as to the numbers of people involved, because participation is a function of a number of factors at any given time. These factors include the knowledge of mineral occurrences, type of extraction techniques used, the availability of local markets for the product, the local price currently being offered and the availability of alternative cash-earning opportunities.

6. Participation for many remained seasonal, an adjunct to agricultural activity, or of a part-time or target nature. Activity levels and involvement picked up when new finds of easy-to-work, high-value deposits were made, for example sapphires in Rwanda; gold in Papua New Guinea (Mt. Kare), Brazil (Roraima) and the Philippines (Mount Dilawao); and when once restricted areas were opened to local participation (e.g., the diamond fields of Angola in 1991). Nevertheless, activities also declined in those areas where economically and technically minable ore reserves were depleted (e.g., Serra Pelada, Brazil), or where once accessible deposits were closed to further exploitation (e.g., Amazon Indian reserves in Roraima and the Bom Futuro mine, Brazil).

7. While a hard core of full-time miners still exists, there is also constant movement in and out of the sector. This continuing reality makes it exceptionally difficult to develop a clear picture of the nature and extent of participation in this subsector of the minerals economy. It has stymied the definition of specific needs at any given time and complicated efforts both to develop effective support programmes and policies and to monitor the evolution of progress and problems in the field. In spite of these difficulties, initiatives have been taken in a number of countries to address different issues at a number of levels.

8. One main area of progress has been in the legal recognition of mining rights. In some countries, artisanal mining, especially for precious and semi-precious minerals, has only recently emerged from the shadow of illegality. In other countries, artisanal mining is not only officially sanctioned but is also now being encouraged. Revised or new mining codes and regulations that legitimize artisanal activity have been promulgated in

/...

Brazil, Ghana, the Philippines, Zimbabwe and Guyana, while in Zambia, Swaziland, Angola, Guinea, Benin, Oman, Ethiopia and Namibia, they are currently being prepared. In some countries, however, the approach has remained erratic and piecemeal, with efforts focusing on particular problems or issues. For example, one Government recently extended formal recognition of prospecting and mining rights to the artisanal miners working in one area of the country in exchange for their acknowledgement of government authority in that region.

9. To date only a few countries have established or are in the process of setting up special programmes or agencies to address the needs of indigenous artisanal miners. In Ghana, the Small-scale Mining Project operates as a separate division/activity of the Minerals Commission. In Chile, a separate corporation has been set up by the Ministry of Mines and the Empresa Nacional de Mineria (ENAMI) to provide start-up funding and staffing. In Morocco, the Centrale d'achat et de developpement (CADETAF), which has existed since 1960, has the objective of overseeing and promoting small-scale mining and includes provisions for the purchase and marketing of ores, technical assistance and some social services. In Bolivia, the Government and the Chamber of Mines are collaborating to set up a separate organization, the Fundacion de Asistencia para el Desarrollo de la Mineria (FADEMIN). In Oman, the Government announced its decision to distribute the mining rights to over 300 small chromite deposits to its citizens and to provide support, including technical assistance, loan facilities, equipment-lease-to-buy schemes and marketing arrangements.

10. In other countries, Governments work through existing departments and institutions to assist small-scale miners. In Zimbabwe, different departments provide laboratory and field services to artisanal miners. In Nigeria, the School of Mines at Jos provides beneficiation services to area miners. Sometimes programmes have been modified or extended in an effort to include artisanal miners, such as Zimbabwe's Department of Mines plant-hire scheme.

11. In most countries, as the importance and problems of artisanal activity have been recognized, government officers have been assigned nominal responsibility for at least monitoring the subsector. In some cases, concerns have moved to the clarification of existing policies and approaches or the development of new ones.

12. Artisanal miners have at times taken affirmative action to protect their own interests. They have organized themselves into both formal and informal collectives for production and marketing. They have established ad hoc confederations or incorporated associations to represent their interests nationally and internationally. Examples of both production cooperatives and miners' associations can be found on all continents, including such groups as the Morobe Gold Miners' Association (Papua New Guinea), the Small-scale Miners' Association of Zimbabwe, the Namibia National Small Miners Association, Gemstone Corporation of Zambia, Guyana Gold and Diamond Miners Association, USAGAL (the garimpeiro syndicate of Brazil), Davao Ore Processors and Small-scale Miners' Association (Philippines), Mindanao Federation of

Small-scale Miners' Associations (Philippines), and the miners' cooperative movement of Bolivia.

13. Local production collectives, while concerned about safeguarding the physical access of their members to mineral deposits, often go beyond simple security arrangements to include infrastructure development, equipment and production sharing, and common marketing and financing arrangements. Some legally constituted cooperatives have secured debt financing and technical support to upgrade their mining operations.

14. The "professional" associations have other interests. Organized to promote, support, strengthen and protect the rights, welfare and interests of small-scale miners in their respective countries, their activities and membership services have included information dissemination (namely, technology, law, marketing, finance, management and safety); coordination of training opportunities; lobbying and negotiations with Governments, large mining companies and mineral buyers; identification and evaluation of investment opportunities; and dispute resolution between members. A few have put together pilot projects, to rationalize and improve the productive activities of member and non-member miners or to establish new downstream processing, manufacturing and marketing opportunities. In a number of cases, regional processing facilities have been established. Attempts have also been made to set up indigenous gold and stone jewellery craft and manufacturing industries.

15. These activities have often been implemented with the assistance of other non-governmental or regional development organizations and set up with external funding. In fact, external agencies have come to regard these "grass-roots" associations as potentially effective and less bureaucratic vehicles for promoting social, economic and technological change in the subsector. Where associations do not yet exist, some Governments, for example, Ghana, Guinea and Chile, have expressed interest in encouraging their formation.

16. Success in the technological transformation and upscaling of artisanal operations has been realized on a very limited scale. Recent experiences in Bolivia and elsewhere suggest that transformation can be effected when the impetus for improvement comes from the miners themselves. Furthermore, technological innovations need not be dramatic to greatly enhance productivity, but must fall within the capabilities of the workforce to operate, maintain and manage them. They must be sensitive to existing environmental conditions that pose real operating constraints. Their cost, ease of procurement and installation, and availability of replacement parts and units will also impact on their acceptability and successful integration.

B. Small mechanized mining

17. In some countries, small semi-mechanized commercially viable mining operations, controlled and managed by local entrepreneurs, have long existed. They are most commonly found in Latin America and in some countries of Asia (India, Turkey, Malaysia, Thailand, the Philippines and Indonesia). In Africa, they are only found in Zimbabwe. These small domestic operations have recently suffered some major setbacks, as drought and recession have adversely affected their ability to remain viable in countries as diverse as Peru, Mexico and Zimbabwe.

18. In most other countries, there is a glaring disparity between the small operations of artisanal miners and the medium to large state- and foreign-owned mines. There is neither a local nor a foreign-owned small mechanized mining industry in existence.

19. With the advent of structural adjustment, economic reforms and new attitudes towards foreign investment, many countries, including the United Republic of Tanzania, Yemen, Angola, Mexico, Peru, Benin, Oman, Uganda, Namibia, Ecuador, Venezuela, Bolivia, Swaziland and Zambia, have redrafted their mining and/or investment codes during the past few years. As a result, foreign investment in exploration and mine development has picked up dramatically in some countries, and has led to the opening of a number of new mines. For example, the United Republic of Tanzania's Investment Promotion Act of 1990 facilitated the opening of three new semi-mechanized mines as joint ventures. In Ecuador, the opening of San Bartoleme silver mine as a joint venture between the Government and foreign parties marks the first time that a United Nations revolving fund find has become a small commercial productive mine. Most new activity promoted by these changes has, however, led to the development of medium and large mines.

20. Other developments included the implementation of an agreement between the Government of Algeria and a United States firm to help develop an indigenous small-scale gold-mining industry, based on near surface veins located in the southern part of the country. The plan includes the provision of appropriate equipment, such as portable crushers, which can eventually be manufactured in Algeria. The effort may eventually be expanded to small zinc and titanium deposits. In Rwanda, the Government has expressed its interest in reopening 20 old tin and wolfram mines previously worked on a small artisanal basis. However, the cost to rehabilitate them for commercial operation may be prohibitive.

C. Marketing and financing

21. Many Governments are still involved in buying and marketing domestic mineral production. Existing state mineral processing and/or marketing corporations have generally retained the pre-emptive right to buy all or selected mineral commodities produced domestically, whether by large or small miners, and to sell that production internationally. These arrangements are

being increasingly resisted by medium- and large-scale miners who wish to deal directly with consumers. For the small miner, however, government-organized buying of non-precious minerals can sometimes be of critical importance, particularly where the possibility of complementary, mutually beneficial relationships with local medium- or large-scale miners and processors do not exist. Otherwise, small miners are at the mercy of local and international mineral traders who do not always deal with small producers on a fair and equitable basis.

22. Government-buying schemes have come to focus on precious minerals, specifically gold and gemstones. These schemes usually require all or a fixed proportion of production to be sold to the national bank or to individual or corporate buyers licensed by the Government, but they have encountered difficulties in attracting the production of informal miners and even of small miners who operate legally. In the past, as little as possible was sold through legal channels. This situation continues to be a major problem in many countries, for example, Nigeria, Burkina Faso, Zaire, Brazil, Rwanda, Suriname, the Central African Republic, Angola and Venezuela.

23. Where Governments have been prepared to pay competitive international prices in foreign exchange or in local currency tied to free market exchange rates, illegal sales have been reduced (Ghana and Chile). Recently, the Bank of the United Republic of Tanzania overhauled its gold-buying scheme and is now offering prices tied to the parallel market value of the schilling. The Government of Guyana is currently buying gold at the free-market price and making half of the payment in foreign exchange. The most radical departure from past practice has taken place in Peru, where the Government is attempting to establish a free and open market for both the sale and the purchase of gold.

24. In the case of coloured-stone marketing, progress has been more haphazard. The Government of Zambia sponsored a gemstone auction, attended by buyers from all the major cutting centres, but there was mixed success in getting local producers to sell openly. Colombia, trying to regularize its own emerald trade, hopes to establish Bogota as the international buying/auction centre for emeralds. The Government of Viet Nam recently contracted with a Bangkok-based trading company to set up a purchasing network to buy rough stones from small miners. Myanmar has taken another approach: the Government legalized smallholder production in the form of two-year joint venture agreements in which nationals must give the Government buying agency first choice of their production. The miners are allowed to keep and sell the less desirable stones, and are paid approximately half of the international sales price on the product marketed by the Government. Prior to this arrangement, virtually all artisanal production was being diverted to the parallel market; now the Government has begun to generate revenue from this activity.

25. Many countries have redrafted their investment codes, along with their mining codes, with the express purpose of trying to attract foreign venture capital for investment in the domestic mining industry. Adjustments have been made to taxation regimes, foreign exchange and profit repatriation

/...

requirements, ownership restrictions, licensing rules and procedures for exploration and mining. Additionally, a number of countries have been able to secure international assistance to complete ground and air reconnaissance surveys, to organize geological information and establish a point of departure for more detailed exploration effort.

26. With more information on the potential mineral endowment and new formalized approaches to foreign investment, these same countries, some with external assistance, have made great efforts to bring this information to the attention of potential investors. Studies have been completed and strategies for investment promotion framed. Investment brochures have been published, and regional investment promotion exercises organized: the United Nations has worked on such projects with Guyana, Ghana, Bolivia, the United Republic of Tanzania and the Philippines. Only recently have some of these efforts begun to yield positive results, with foreign private investment being redirected to certain countries. However, almost all of the new investment has centred around medium to large projects. In a few cases, mining cooperatives and communities have managed to interest large multinational mining companies to collaborate in upgrading and expanding the scope and scale of local mining operations. The quantity and quality of resources that must be present to attract large-scale corporate involvement ensures that such operations will also become medium or large.

27. The formation of independent foreign investor groups with mining interests has opened the door to new financing possibilities for small commercial operations. The lowest size limit for this sort of financing appears to be about US$ 5 million. This, coincidentally, is similar to the lower limit for public sector bank financing of mining projects in the developing countries. This limit provides the conceptual distinction between projects that have the potential to be commercially remunerative and bear reasonable risk and those for which the potential rewards cannot justify the higher risks. Implicit here is the idea that $5 million-plus projects can carry the costs of the scientific management, engineering staff and technology required to run an efficient, profitable mining operation. This limit denies financing to smaller locally identified and promoted mining investment opportunities, but can potentially underwrite commercial mining at the high end of small scale.

28. Historically, institutions such as the Banco Minero of Bolivia and Peru and Empresa Nacional de Mineria (ENAMI) in Chile have provided financing for domestically owned small commercial mining operations. The banks, however, were never run as commercial operations themselves; loans became subsidies and grants. Bank operations could no longer be sustained and both Peru and Bolivia closed their mining banks this past year. The role of ENAMI as supporter of the small-scale subsector had been dramatically curtailed, but it has now affirmed its commitment to finding constructive, renewable ways of assisting small miners financially.

29. The breakthrough for this subsector has occurred as a result of the willingness of some donor agencies, development banks and charitable

/...

foundations to extend to smallholder mining operations revolving loan facilities, originally set up for conventional small business enterprises. Such facilities are now operational in parts of Latin America. Based on preliminary but encouraging results there, some agencies have expressed a desire to try them in other places. A few Governments and parastatals such as ENAMI are now administering or are about to establish credit facilities for miners, also set up along the lines of revolving funds. In addition, state-owned small business banks, which in the past were reticent to make loans to small mine entrepreneurs, have now begun to review their policies.

II. TRANSFORMATION OF ARTISANAL OR INFORMAL MINING

30. In many countries, artisanal mining has assumed an important and, at times, even critical economic welfare function. In diverse areas of the world, artisanal mining has become the principal livelihood for millions of miners and their families and the mainstay of local rural economies. During periods of environmental and economic stress, it has met the needs of a much wider population to whom it has provided the wherewithal sufficient to stave off further deprivation. The dilemma of artisanal mining is its downside. As a migratory and transient activity, it has historically been highly disorganized, difficult to monitor, characterized by inefficient mining and processing practices, and has remained a part of the informal economy. Secondary problems include loss of mineral resources; localized environmental degradation; unsafe and harsh working conditions; temporary, often wretched living conditions; and economic exploitation by financiers, mine operators, mineral traders and law enforcement officers. Because much artisanal activity involves the mining of high-value, low-bulk, easily marketable and exportable commodities, including precious metals, gemstones, tin and chromite, it is also prone to illegality. For government authorities, this aspect has proved most problematic, given the loss of government tax revenues and foreign exchange earnings involved, and the violence and criminal activity that may follow.

31. Proponents argue that, if properly organized and supported, artisanal mining has the potential to become a basis for related value-added economic activities, and to provide the raw material inputs for other domestic manufacturing and fabricating industries. It can expand employment and income-earning opportunities in rural areas, help to sustain rural lifestyles and communities and generate additional income for both local and national economies. It can be rationalized and formalized, and made more efficient, economic, safe and environmentally benign. Artisanal mining can be constructively transformed, its benefit potential increased and its disadvantages eliminated or at least minimized.

32. However, the "constructive" reconfiguration of artisanal mining may mean different things to the different parties concerned. To artisanal miners, it may simply mean enfranchisement of their mining rights and easy access to finance, equipment and markets. To others, it may signify the creation of opportunities to regroup artisanal activity into organizational units

/...

conducive to mechanization or more systematic mining, or build-up of a technically and commercially viable small-scale indigenous mining industry as a springboard for the effective participation of local people at all levels of activity. Priorities and implications may vary from one country to the next, and an international consensus on the direction and means to get there may not be easily achieved.

33. For the purpose of this report, it is suggested that the transformation be regarded as a multi-stage process. The first step would be to create the "enabling" conditions to allow artisanal miners to operate and market their products legally, to participate in programmes designed to increase their efficiency and reduce their costs, and to develop a level of comfort with the formal economy. Artisanal miners, whether as individuals or groups, must see and experience some prospect of gain from their integration into the formal economy before efforts towards further "transformation" can even be contemplated.

34. In the next phase, the objective would be the technological and managerial upgrading of mining operations. This may necessitate the organization of miners into larger groupings. It may mean access to better quality and more appropriate tools or machinery. Alternatively, this phase might also allow for the transfer of mineral rights from the "legalized" artisanal miner to a larger or more solvent commercial enterprise in which he or she may continue to participate as a partner or an employee.

35. A third phase would allow for the full commercialization and "upscaling" of those properties for which it may be technically, economically and managerially feasible.

36. The pace at which transformation can occur will be influenced by the past mining experience of the country. In those countries where the mining tradition has been largely artisanal, there will be few or no commercially viable small mines to serve as models nor a trained indigenous labour pool to draw upon. This situation cannot be remedied by simply opening the door to foreign miners. A modern or even semi-modern mining industry will have to be built up slowly and deliberately over a long period of time. The transformation or even consolidation of hundreds or thousands of artisanal operations will be a major undertaking, involving large investments of time, effort, creative energy and goodwill on the part of all parties - Government, local and international institutions, mineworkers/owners and entrepreneurs.

37. Those countries that have a domestically controlled commercial mining sector in place will have a headstart in the process. Historic precedents, and legal and social frameworks for the commercial organization, operation and ownership of mines by local people, already exist. An example is Bolivia, where the technological improvement and upscaling of artisanal operations have been facilitated by the pre-existence of a skilled workforce, that is, retrenched commercial mineworkers who understand the value of more systematic, scientific mining.

/...

A. Role of informal mining as a safety-valve for structural adjustment

38. Many developing countries have had to contend with severe economic and social dislocation resulting in part from the implementation of structural adjustment programmes. Concerns have been raised about the social impacts and costs of the measures taken by Governments in their adjustment processes, including the reduction or elimination of food and basic services subsidies, repeated devaluation of the local currency, the withdrawal of Government from commerce and industrial activity, the privatization of state-owned and managed enterprises, including social services, cutbacks in remaining services etc. This has resulted in dramatic increases in the prices of many basic commodities and services, while incomes have not expanded accordingly. Sub-economic industrial and commercial activities, both private and state-owned, have been allowed to fail; closure and retrenchment have affected many sectors of organized economic activity.

39. Individual and community hardships have been exacerbated by the prolonged economic recession, further compounded by drought in some areas. Alone or together, recession and drought have pushed certain activities over the edge of commercial and technical viability, threatening subsistence agriculture and marginal industrial and commercial enterprises, as well as both small and large commercial mining operations.

40. In many developing countries, artisanal mining has become a major safety-valve, cushioning the worst effects of structural adjustment, recession and drought by providing people in the rural areas with an alternative or complementary way of securing a livelihood. The very characteristics that have made artisanal mining a source of anxiety and concern to regulators and commercial miners have allowed it to become a source of critical supplemental or primary income for large numbers of rural people, both skilled and unskilled.

41. In Zimbabwe, drought and currency devaluations have led to an increase in artisanal activity, particularly along the river-banks. The income derived from river panning has made a critical difference in people's ability to sustain themselves and their families in the countryside. The potentially disastrous economic effects of the recent closure of a state-owned tin mine were mitigated by allowing retrenched miners access to eluvial tin deposits in the surrounding area. Working as cooperatives, the miners were not only able to maintain a reasonable level of productive economic activity, but also discovered new primary tin deposits. The Government of Indonesia, in order to reduce the impact of cutbacks in state-owned tin mining operations is planning to open its abandoned onshore properties to small-scale mining cooperatives and the private sector. Ghana's Small-scale Mining Project is an explicit part of the employment generation component of the Government's Programme of Action to Mitigate the Social Costs of Adjustment (PAMSCAD). In Angola, the northern diamond fields are now providing subsistence incomes to an estimated 50,000 poverty-stricken peasants, urban refugees and demobilized soldiers and their families.

42. In Bolivia, the state mining corporation, COMIBOL, and the Government have established procedures for the privatization of the company's assets. Some 26,000 miners have been retrenched during the past few years, with many able to find alternative employment as small-scale mining entrepreneurs or co-op miners - not unexpected in a country that has been referred to as the "land of small mines". It is estimated that four out of every five miners in Bolivia are now either artisanal or co-op miners. The alternative to unemployment for others has been to move to the tropical lowlands to work in the coca fields. With the sale of its economically viable mines and properties to the private sector, and the eventual shutdown of any remaining mines, another 7,500 miners may lose their jobs. Artisanal and cooperative mining will have a critical role to play in the productive absorption of a new round of "unemployed" miners, who may otherwise be forced to turn to less legitimate forms of economic activity.

43. Ironically, the difficulties that resulted in an increase in artisanal activity in some countries have also led to the closure of small locally owned commercial mines, especially in countries where they have historically thrived - Bolivia, Mexico, Peru and Zimbabwe.

B. Basic technical, technological and financial requirements for transformation to commercial process

44. The successful transformation of artisanal or informal operations into commercially viable ones hinges on a number of factors and conditions coming together for the entrepreneur at the same time, including the following:

(a) Availability of prospective ground;

(b) Implementation of unambiguous legal and regulatory frameworks, in which all rights, obligations and responsibilities are clearly defined; permitting and reporting requirements are not overly complicated or bureaucratic; security of mining tenure is guaranteed;

(c) Emergence of a mentality that allows the miner or entrepreneur to think of mining as a profession, of his or her mine as a business, and of the ore deposit as an asset;

(d) Access to knowledge and skills required to run the mine in a business-like fashion, including basic accounting, management and marketing skills and a more than rudimentary understanding of mine geology, mining methods, safety, and concentrating techniques;

(e) Access to a market, within reasonable proximity to the mine, that will provide a fair return in relationship to local trade prices, or in the case of exportable commodities, to international market prices;

(f) Availability and means of procuring the use of basic mining, materials handling, processing and environmental control tools and technology,

/...

of reasonable quality, whether of a manual or a mechanical nature, and experience in their proper use and maintenance;

(g) Access to enough capital to develop the mine, install appropriate equipment, commence production, bring the product to market, and survive any start-up problems or delays in the receipt of payment for the product;

(h) Enforceable accountability to debt financiers and equity holders.

45. Estimates of the investment costs to upgrade artisanal to semi-mechanized operations range from $20,000 to hundreds of thousands of dollars, depending on the type of mine, ore-body characteristics and milling requirements. A fully mechanized small mine can cost in the millions. While a major obstacle to upscaling for local entrepreneurs has been the lack of access to the capital necessary to implement mechanization, adequate financing is not a sufficient condition for successful transition, in and of itself. To enhance the chances of success, all conditions - legal, business sense, technical skill, and accountability - must be present.

C. Role of foreign capital or entrepreneurship in development of small commercial sector

46. Major mining companies, with rigid profitability and large overhead requirements, have established minimum size specifications, tied to their assessment of a property's cash flow generating potential. Such specifications serve to guide their exploration and investment efforts. Few operate small mines divisions anymore, inasmuch as small mines are regarded as being marginal profit centres at best.

47. Exploration for and investigation of smaller prospects have been left to the initiative of medium and smaller entrepreneurial exploration and mining companies and professional prospectors. For the past 10 years, their exploration efforts have concentrated on precious minerals, usually in their home countries, but increasingly abroad. Often, their principal objective is speculative, that is, to identify potentially interesting deposits, prove them up to a point, and then promote them to major mining companies on a joint venture basis or for cash and a residual interest. In such cases, properties with potential to become medium- or large-scale mines have frequently ended up in the portfolios of larger mining companies having the financial wherewithal, management and operating expertise to bring them into production.

48. Junior companies have also taken advantage of the new opportunities available to foreign investors in the developing countries. Their activities tend not to focus on costly and time-consuming grass-roots exploration for blind deposits, preferring instead to target older, abandoned properties, waste dumps or known occurrences for further evaluation. They have also been attracted to producing properties - areas currently being worked by artisanal miners or small semi-mechanized mines operated by local entrepreneurs or companies. Requiring modest amounts of initial investment, these kinds of

properties are eminently affordable prospects for junior companies, many times ending up in the hands of the medium-scale speculative companies.

49. Speculative approaches have not and do not result in the establishment of commercially and technically viable small mines anywhere. What ensues, if good potential is proved, is the development of medium- and larger-scale, modern mechanized mining operations, owned and managed by large foreign mining companies.

50. Recent examples of junior companies or foreign entrepreneurs and investors who have developed small mines to production on their own initiative in developing countries are few. Of greater interest are the efforts of some junior companies and investor groups to work directly with local partners. They have set up local offices, created partnerships and applied for concessions, or they have bought into existing operations, which serve as convenient, functioning points of entry onto the local scene.

51. Many problems have, however, beset these initiatives. The lack of well-defined guidelines and administrative procedures for acquiring concessions and mining permits, for importing equipment etc. have effectively derailed a number of well-intentioned efforts. Bureaucratic delays and renegotiations have stalled progress for months or even years. Too frequently, the occasional conflicts between foreign and local partners, or between the mining venture and local parties, have been resolved on political, rather than juridical, bases. Projects have also failed because of shortcomings in the experience and qualifications of the foreign management team, which adversely affected their ability to make technically and economically sound decisions.

52. Small foreign companies do not have the financial resources to endure long delays or become entangled in drawn-out negotiations. Nor do they usually have the political stature to short-circuit bureaucracy. Their limited objectives, along with their own financial and managerial weaknesses, have further reduced their capability to be effective vehicles for promoting the development of a small commercial mining sector.

53. However, their tactical need to collaborate with local counterparts in decision-making, in management functions and in risk-sharing is much greater than that of large companies. Hence, their potential to contribute to the development of an indigenous mining sector holds out more promise. Just as for the artisanal subsector, an essential prerequisite for their success will be the creation of "enabling" conditions. These conditions must alleviate the most debilitating of the local constraints to external participation and joint progress for such partnerships to have even a reasonable hope of working.

D. Fostering entrepreneurship: fashioning and supporting constructive relationships between domestic and international concerns

54. Critical areas in which relationships between domestic and international concerns could be shaped to foster the development of entrepreneurial skills and interest among local people include markets, technology and capital. The key is to encourage relationships that reflect a complementarity of interest and offer all parties opportunities for measurable gain. Examples of such relationships already exist and will be used to illustrate some of the possibilities. These relationships often incorporate elements of technology transfer, education, capitalization and marketing all in one.

1. Market-centred

55. Arrangements of convenience have occasionally emerged between multinational mining companies and small miners. For example, a few multinationals have allowed artisanal miners to rework tailings or abandoned areas of operating mines or concessions, often on the understanding that all or part of their production would be sold to the company, for a fair price. Some of the chromite cooperatives operating on the Great Dyke in Zimbabwe rework areas that have already been mined out using more mechanized methods, and sell whatever they are able to scavenge directly to the mining company. In Namibia, one company has a long history of buying tin from artisanal miners picking away at surface occurrences. After the commercial mine was closed, artisanal activity was only able to survive as a result of the continuing operation of the company's processing plant. This relationship only recently ended with the plant's final shut-down, leaving behind a community of miners without a market.

56. In both of these examples, the activities of the artisanal miners and the mining company are complementary and do not compete for the same resource. The relationship can be informal or contractual. A formalized relationship gives the mining company more freedom of action to support the activities of its arm's-length collaborators, for example, by providing access to more durable tools, mechanical equipment and training. The miner may also be assured of a fair return on the product.

57. Another type of relationship that could be fostered is joint venture marketing arrangements, either between legally licensed local mineral buyers and international mineral exporters or traders or between Government and the international interest. In Viet Nam, a government organization has recently signed a joint venture contract with a Bangkok-based trading and fabricating company to set up a buying system and local factory for the cutting and polishing of rough stones, which will then be exported to Europe and other parts of Asia. The rationale is to provide an accessible and fair market for the rough stones, as well as value-added employment and revenue-generating opportunities for the country. Vietnamese will be trained in cutting, polishing and international marketing; modern and appropriate finishing

technology will be made available; and the international market-place will be accessed without having to create another layer of bureaucracy between the miner and the market. In countries where there are now free markets in the trading of exportable commodities or where they are soon to exist, such joint venture relationships, which explicitly incorporate value-added components, should be given serious consideration. This type of arrangement is potentially applicable to certain industrial minerals as well as gemstones and precious metals.

58. Where Governments have removed themselves from the business of marketing minerals, especially in those countries that had institutions catering to the needs of small miners, for example, Bolivia and Peru, the creation or identification of alternative above-board marketing mechanisms and channels will be fundamental to efforts to regularize and upgrade artisanal activity. This is an area in which international private concerns may have a critical and vital role to play.

2. Technology and capital-centred

59. International companies may become effective channels for accessing technology, technical experience and capital. Some of the major mining companies have tried to establish joint ventures with local mining cooperatives and communities holding mining rights or operating informally on gold deposits with large production potential. Mitsubishi made overtures to the miners' cooperative at Serra Pelada, Brazil; Rio Tinto Zinc entered into an agreement with the San Luis cooperative in Ecuador; and a landmark agreement was reached between CRA Ltd. of Australia and an incorporated group of local landowners in Papua New Guinea to mine the surface deposits at Mount Kare. These relationships have the effect of replacing artisanal with large-scale mechanized operations, but they provide local miners and claim holders with a share of the returns, as well as training and employment opportunities.

60. Local entrepreneurs and mine owners have also initiated contacts with foreign companies in the hope of accessing sufficient capital and technology for the upscaling and modernization of existing facilities (e.g., Ecuador mining cooperatives). Increasingly, entrepreneurs with small undeveloped concessions of precious and industrial minerals have been trying to attract foreign attention but often without success. While serious foreign investor groups have recently been formed, they are also restricting themselves to investment opportunities of a certain minimum size, located in certain geographical areas, where their members have established contacts and experience. This is done to minimize risk, but it limits interest to concessions or mines that have the potential to satisfy return on investment expectations. This means that only the richest or larger, more consolidated artisanal operations will qualify for consideration.

61. The gap between foreign investor expectations and the return opportunities provided by small holdings may be impossible to bridge. What

other options exist? Looking beyond equity sources of funding, commercial lenders have been reluctant to finance anything but larger or well-established projects. Development banks have been resistant as well. Current lending policies limit underwriting to projects with capital requirements in excess of $5 million. While this may be less risky and administratively less complicated, it also reduces the potential benefit of each dollar lent, in terms of poverty alleviation, employment generation and the expansion of rural economies.

62. A few development banks have searched for creative alternatives to traditional administrative rigidity. The Asian Development Bank, for example, has committed itself to a loan fund and support programme to promote the development of a small-scale coalmining industry in the Philippines. Small operators will be identified and earmarked for assistance to mechanize and rationalize their mines. The Inter-American Development Bank participated in a group-financing project with the Andean Development Corporation, Bolivia's Banco Minero and the Ecumenical Development Cooperative Society, to finance an industrial minerals project directed by a miners' cooperative in southern Bolivia. Just over $2 million in loans were made available.

63. A different approach has been taken by one of the European development banks. Instead of direct lending, it chose to work through local non-governmental organizations to set up and administer revolving credit facilities for small industries, including a modest component for small miners. The objective has been to facilitate the technological upgrading of mining operations. In Bolivia, this revolving fund has been augmented with a contribution from Canada's bilateral assistance programme. Currently, four mining projects are being assisted, with two of them having begun to repay their loans.

64. International charities and religious organizations have also advanced credit to small miners in a number of countries. Credit is provided in the form of loans, usually given to organized groups of miners, that is, cooperatives or associations. In almost all cases, this money has been used to upgrade mining technology, and has led to significant productivity, and in some cases, dramatic employment increases. Since 1988, the Ecumenical Development Cooperative Society has itself advanced close to $1.5 million in loans to mining cooperatives in Bolivia for mine rehabilitation and mechanization projects.

E. Role of Government

65. Artisanal mining has become a fact of life in many developing countries. It is not surprising that Governments prefer to deal administratively with a manageable group of large mining companies, rather than face the challenge of upscaling hundreds of small unmechanized mines. None the less, it is in national Governments' own interests to formalize the activities of artisanal miners to the greatest extent possible and to facilitate their improvement and upscaling wherever possible.

/...

66. As long as artisanal mining operates illegally, the amelioration of some of its worst technical, economic and environmental performance deficiencies will be thwarted. While some Governments continue to be ambivalent towards artisanal activity, regarding it as a major administrative and law enforcement headache, any hope for its rationalization and potential transformation requires at minimum its legalization. Governments must define appropriate legal contexts for its operation (see section III below) and be prepared to modify their approach in the light of evolving experience.

67. The rules and regulations created should be simple, straightforward and unambiguous. Permitting and licensing procedures should involve as little bureaucracy and paperwork as possible. Mining rights must be secure, but should also be transferable among artisanal miners, and under certain circumstances to larger legally organized businesses. Minimal but basic environmental, health and safety standards should be promoted and supported by an administrative presence in the mining areas that can work to curb the worst abuses, while offering technical assistance to improve practices. The deregulation of the market-place may also be necessary, but should be accompanied by efforts to stimulate the creation of sanctioned free-market arrangements.

68. At the same time as rules are established for artisanal miners, the rules for commercial or industrial small- and medium-scale operations should also be set. This is as important for indigenous entrepreneurs as it is for potential foreign investors and joint venture partners. Artisanal miners should be able to preview the legal and operating implications of "upscaling". Local entrepreneurs should be aware of the terms of participation, and foreign-based junior companies should be able to enter a country with all procedures and regulations clearly defined, and not subject to recurrent negotiation.

69. If the Government has an interest in promoting joint ventures between local and foreign entrepreneurs, principles regarding the nature and extent of local participation should be clearly explicated. Issues of profit repatriation and reinvestment, exchange and marketing controls will also have to be addressed and the dispute-adjudication process removed as far as possible from the realm of politics. In countries where no small upscaled mining activity exists, and new models need to be created, it may be necessary to reserve access to certain mineral resources for smaller companies and prohibit the transfer of mineral rights to larger companies.

70. Apart from the legal framework and its oversight, Governments also have a central role to play in extension work and training of artisanal miners. This work can and should be coordinated with the assistance of publicly supported national and international institutions. Government can also facilitate the organization of credit and loan facilities and technology diffusion for the subsector.

/...

III. RECENT NATIONAL LEGISLATION

71. The legal definition of what constitutes small-scale mining has been repeatedly argued in the past decade and each interested country has selected its own criteria to describe its reality. In Ghana, for instance, "small-scale" gold mining is based on methods not involving substantial expenditures and undertaken by individuals or groups not exceeding nine in number or by cooperatives with 10 or more members. In the Philippines, any mining activity that relies heavily on manual labour without the use of explosives or heavy mining equipment falls within the definition. Suffice it to say, for the purpose of this report, that small-scale mining must be defined in relation to a real context and to indigenous institutions and local customs. Recent legal definitions, although different one from the other, have limited the concept to low-technology artisanal operations, as distinct from small mechanized commercial mines.

72. The most recent laws and regulations that have been adopted, in Ghana (1989), the Philippines (1990) and Zimbabwe (1991), all establish new legal frameworks and fiscal regimes endeavouring to solve the most serious problems that have plagued the subsector in recent years. These laws are eminently responsive to worker safety, environmental protection, waste of natural resources and illegal dealings in minerals. The selected approaches are pro-active and legislators have made considerable effort to tailor-make legal regimes that are better adapted to the local characteristics of small-scale mining. Absent is any repressive type of attitude; instead, there is a supportive and educational approach, which embodies full recognition of the importance of artisanal mining for their countries.

73. The eligibility criteria to obtain a mining licence or a contract with the State inevitably refer to the citizenship of the applicant or contractor who, in all cases, must have the citizenship of the country in question. Such laws may also specify that the application or contract will only be issued or executed with a resident of the area or, if not with a person residing in the area, then with someone that has registered in the district centre established for that purpose. The citizenship requirement applies equally to cooperatives, associations, partnerships and corporations regrouping individuals wishing to undertake small-scale mining activities.

74. In addition, the area where such activities will be conducted must have been designated as a small-scale mining area prior to being open to such activities. In the case of Zimbabwe, the municipal council or local authority has to identify such areas. Ghana and the Philippines have also adopted the prior designation of the small-scale mining area as a component of their legal framework. The granting process will involve consultation with other agencies co-managing the development of the natural resources, be it at the local or central government level, dealing with aspects such as water, roads and environment.

75. The term of the licence or contract will vary according to the number of individuals involved, whether acting as an informal group or organized in a

cooperative form of association. The term of the Philippines contract is two years, renewable for a maximum of five years, twice in the case of cooperatives. The area covered by the contract or licence will not exceed 28 acres in the Philippines. In Ghana, it will vary according to the number of individuals involved; if not more than five people are working on the plot of land, the maximum area will be three acres and, if that number exceeds four but is less than nine, the maximum acreage will be five acres, possibly reaching 25 acres for cooperatives of more than 10 persons.

76. Extensive provisions have been provided in most modern small-scale mining laws with respect to the working conditions and requirements that must be fulfilled by miners. The Philippines small-scale mining law provides for a mine plan to be filed. It refers to a two-year programme of activities and methodologies employed in the extraction and production of minerals or ore-bearing materials and must include a financial plan and other resources in support thereof. It is common to find in such legislation the obligation to produce in an effective and efficient manner, using good mining practices and having regard to the health and safety of workers and the protection of the environment. Custom milling facilities can be established and, in default, the Government can provide such a service to ensure maximum recovery. If such services are provided for, mercury will be banned in the area as provided in the Philippines small-scale mining act. Government will establish laboratories and render metallurgical and laboratory services in order to assist small-scale miners. The Ghanaian district centre has been established not only to register miners and prospective miners and to supervise and monitor operations and activities in the area, but also to advise and to provide training facilities as may be necessary for efficient and effective operations. The working rules established by the Zimbabwe regulations go into great details specifying standards regarding distance from river-bank, vertical depth, undercutting, backfilling and so on. This reflects the most current approach adopted in modern mining laws, which prefer to provide guidance and services to small-scale miners as a complement to the traditional monitoring function of the administration. The use of explosive mercury and heavy equipment is subject to a ban or to rigorous control.

77. The marketing or disposition of minerals and precious metals to the central bank or its duly authorized representatives has been made obligatory at prices competitive with those provided in world markets. Minerals and precious metals may in some other cases be sold through a precious metal marketing corporation which would act as a central buying organization appointing licensed buying agents. In short, the products of small-scale mining activities are as a rule disposed of to a government-designated institution or to its duly licensed representatives. Various schemes have been established to collect taxes and royalties on the mineral output. In the Philippines, the Government share would be 3 per cent on non-metallic minerals and 5 per cent on metallic ones, based on the gross value of the mineral output, and this tax would be in lieu of all other taxes and royalties. This represents the range within which Governments position themselves in relation to taxes imposed on small-scale miners. Ghana provides a three-year tax and royalty exemption for mining-related activities but not local levies. The

/...

Philippines Act, recognizing the importance of a sharing of the benefits derived from small-scale mining, establishes a schedule in virtue of which tax revenues are allotted. According to that schedule, the collected revenues would be shared as follows: National Treasury, 30 per cent; Provincial Government, 15 per cent; Municipality, 15 per cent; Barangay, where minerals come from, 10 per cent; Small-scale Production Fund, 10 per cent; Special Fund to be administered by the department for reforestation and environmental rehabilitation of small-scale mining areas, 20 per cent.

78. This is an innovative approach worthy of mention and of encouragement, because small-scale miners themselves become contributors to the budgets of various governmental institutions and become more integrated in the economic life of the country. Their contribution also becomes visible resulting in a greater recognition of their importance in the economic development of the country. New features such as the creation of a Small-scale Protection Fund in the Philippines also represents a worthwhile evolution of the world of small-scale mining regulation. This fund, to be administered by a mine board, has the mission to disseminate information and to provide training for small-scale miners. It is concerned with health and safety matters and environmental protection, and ensures the establishment of a mine rescue and recovery plan, including the procurement of rescue equipment necessary in such emergencies as landslides and tunnel collapse. This fund is made available to address the needs of small-scale miners in the event of accident or similar occurrences.

79. Under most laws, offences will not only carry a fine or a prison term or both, but they will also make the offender ineligible for a small-scale mining contract or licence for a certain number of years or until the default has been rectified. Penal sanctions in the Philippines run from six months to six years. In Ghana, imprisonment does not exceed a term of two years. Gold or other minerals in respect of which an offence has been committed may be forfeited to the Government. In Zimbabwe, higher fines may reach US$ 2,000, but imprisonment terms have been limited to six months.

80. The past few years may be characterized as the era during which the legal status and rights of small-scale miners have begun to be recognized and their activities brought into the mainstream of economic activity. No longer is the miner considered an operator trapped in illegality, to be treated as a smuggler and an undesirable element. At least in a few countries, a serious effort has been made to allow the miner to function and exercise his activities legally. Furthermore, the legal regimes are themselves supportive of such activities. Governments have realized the contributions that can be made by small-scale miners to the economic and social life of the country.

IV. TRANSFER OF TECHNOLOGY THROUGH DEMONSTRATION PROJECTS AND TRAINING

81. Because of the ambivalent attitude historically taken towards the subsector, the kind of technology transfer and developmental efforts directed towards smallholder and peasant agriculture were never considered appropriate

/...

for small-scale mining. Countries that took a nurturing approach to the subsector were the exception, not the rule. Only recently have international development organizations begun to pay serious attention to the developmental possibilities of the subsector. Preliminary and tentative commitments to support technological development and to explore ways of improving the productivity and efficiency of production units have recently emerged, taking shape in a number of demonstration or pilot projects, training initiatives and research and publication efforts. It should be understood that these efforts have been undertaken with the best of intentions, although a continuing commitment on the part of both local and international organizations and Governments has yet to be secured.

A. Recent demonstration projects

82. Some recent demonstration projects and their results are described briefly below. Most have received or require some form of external financing either in the form of loans or grants. Only the recent initiatives of the Government of Chile and ENAMI have relied on locally available funds.

83. In Zimbabwe, the Small-scale Miners' Association (Zimbabwe) and the Intermediate Technology Development Group (United Kingdom) collaborated to set up a contract gold mill and training centre in 1989 in the north-eastern part of the country. The Shamva Mining Centre project was proposed to redress the lack of technical and managerial skills and the lack of access to more efficient, mechanical mining equipment and processing facilities, which appeared to stand in the way of making local African mines financially viable, and consequently more accountable for their labour and safety practices. Project activities have included the provision of technical advice, mining assistance and processing facilities, a gold-buying service, technical and management training and information dissemination. The Shamva Mining Centre has raised the profile of the Small-scale Miners' Association nationally and internationally, and has served as a model for efforts elsewhere in the country. One of the Association's regional affiliates has been successful in securing European Economic Community (EEC) funding for a new regional mining and processing centre to be based in the southern part of the country.

84. In Malawi, the use of traditional wood-burning kilns to calcine limestone has resulted in a low-quality product, with limited application in the agricultural and construction industries only. The country was forced to import large quantities of chemical-grade lime for use by the sugar industry. The use of such kilns had also led to serious deforestation of hardwood timber resources in the south-central part of the country. The Department of Mines, working with a group of local limestone miners and assisted by the Intermediate Technology Development Group, set up an experimental vertical shaft kiln at Chenkumbi. A successful project would also assist in stabilizing the incomes and livelihood of over 1,500 families dependent on lime production from the Chenkumbi hills. Successful pilot studies resulted in the construction of a commercial-scale kiln. A regional processing centre was set up to handle off-site stone materials. Relatively minor modifications

to traditional materials-handling methods have resulted in major productivity improvements. Some of the neighbouring larger small-scale entrepreneurs have recently installed their own vertical shaft kilns independent of technical or financial support from the Intermediate Technology Development Group (ITDG). The fuel savings alone are proving to be a major economic incentive for adoption given the high cost of increasingly scarce hardwood. The new kilns have also provided another market for refractory bricks, which are now locally produced for the lime, as well as other industries.

85. Since the legalization of small-scale gold-mining for Ghanaians in 1989, the Minerals Commission set up a Small-scale Mining Project with financial and technical support from the World Bank and most recently from the German Technical Assistance Corporation (GTZ). Some of its most recent work has taken the form of demonstration projects, including the establishment of the Tarkwa Mining Centre, which will house an assay lab, a government buying agency, the Mines Department office, and potentially a permanent demonstration processing plant. Another activity has revolved around the development of more efficient processing technology. Equipment has been locally manufactured and set up at various field sites to demonstrate operations. The response has been positive with small miners beginning to place orders. The objective is to be able to provide customized equipment packages that reflect cost constraints and technical needs of the individual mines. This is to be done in collaboration with selected local fabricators. All equipment is being provided on a cash sale or loan repayment basis.

86. In 1992, GTZ sponsored a pilot project at Sotomayo, in the Andean region of Nariño, Colombia. The objective was to use the output of the "tools for mining" effort to solve a set of local mineral-processing problems - one, of a technical nature involving low gold recoveries, and the other, environmental, involving the excessive loss of mercury. The goal was to identify technological solutions that could be locally manufactured and implemented at reasonable cost and with relative ease. A new processing flowsheet was devised, using simple, easy to maintain equipment that could be locally fabricated. The system was fine-tuned in the field, using local miners to corroborate results. However, the reduction of the environmental hazard posed by the process in place was not sufficient motive in and of itself to adopt the improved procedures. The cost savings effected by the recovery of the mercury was not enough to justify the purchase of the new equipment, however affordable, without further financial incentives. The follow-up phase of the project is concentrating on developing an effective dissemination strategy.

87. Following a series of successful United Nations projects to evaluate the industrial mineral resources of Jamaica, a mobile mining unit was organized to demonstrate the viability of developing these resources, principally marble, perceived by many to be too small and scattered to offer any commercial possibilities. The mining unit was equipped with a mobile mounted air track drill, a quarry line drill, air compressor, a heavy-duty flatbed for transporting the product, and a hydraulic fork-lift for loading stone blocks. It was manned by personnel of the Geological Survey Division, who had been trained in its operations. Seven marble quarry sites were opened with the

backing and involvement of local entrepreneurs to provide samples, to delineate an economic reserve base and to produce blocks. The entrepreneurs were taught how to mine and take out rough blocks. Cutting and polishing is accomplished at a central Geological Survey Division facility. As part of the project, both mining and environmental regulations were reviewed and adjusted, and a seemingly viable marble quarry industry has emerged.

88. In the Puno region of Peru, located in the high Andes, members of the Santiago de Ananea Mining Cooperative were able to increase their incomes 350 per cent with the introduction of improved but simple mining and concentrating technology. In 1988, a second cooperative, located on the eastern slope of the Andes, joined the project.

89. Chile's Centre for Mining and Metallurgical Research (CIMM) is a private not-for-profit organization that undertakes basic and applied research. The Mining Division is currently involved in a technology-transfer project with ENAMI, the state-owned national mineral-processing and smelting company serving the small and medium mining sectors. Geophysical ground surveys, some drilling, and extensive geological mapping on three mineral properties resulted in the verification of ore reserve potentials. ENAMI entered into joint venture agreements with the private owners to bring the properties into production on a semi-mechanized basis. The CIMM team is providing engineering expertise, and will train the miners in the use of semi-mechanized mining methods. In addition, a business consultant is scheduled to work with the mine managers to help them develop business and financial management skills. Concurrently, the Ministry of Mines and ENAMI have planned other demonstration projects that will focus on organizing small miners into associations to rationalize the provision of technical support and services.

B. Training programmes and opportunities

90. The lack of technical knowledge and skills has been recognized for some time as one of the major obstacles to the rational, productive and safe development of small mines, particularly at the artisanal level; however, very little headway has been made in remedying these deficiencies. Training programmes have been organized in some countries, targeting mine owners and entrepreneurs as well as mineworkers. These programmes have tended to take the form of seminars, short courses or workshops, extending from one day to a few weeks in duration. They have been organized and sponsored by non-governmental organizations, government departments, external donor agencies and, in a few cases, by private sector interests. Another initiative in this area is the provision of scholarships for college and university-level studies by mining companies and miners' cooperatives for the children of their workers or members.

91. The seminars have been concerned mainly with basic information dissemination and networking, and are sometimes promotional in nature. Such seminars have been organized by small miners' associations in various countries. Discussions typically revolve around topics such as mining rights

/...

and obligations and organizational issues, and usually include presentations by various government departments as a way of informing small miners about the services and assistance they can provide. A few have been more focused, for example, a seminar organized expressly for women miners in Zimbabwe in 1990, which provided an opportunity for women miners and women interested in becoming involved in mining to discuss various issues of concern, including finance, training and operational and administrative problems. Experts from government departments were also present to answer specific questions relating to technical or administrative matters that were posed by women.

92. More technically oriented workshops have also been held on prospecting, claim pegging, mine valuation, mining techniques, safety practices and marketing. In Bolivia, one organization has developed a series of manuals on various unit mining operations, used at workshops organized in the mining areas for mineworkers and cooperative members. In Zimbabwe, the British Geological Survey and other groups have conducted field courses and schools for small miners in four different field locations in 1990 and 1991. The courses covered basic geology and surveying skills, exploration techniques, some mining geology and mine planning, as well as basic financial planning; many of the courses were taught at a mine site. The courses attracted the participation of literate and numerate mine operators, owners and prospectors. Originally it was thought that once these miners were trained they could diffuse skills and knowledge acquired among other miners. This has thus far not proved to be the case. Given the numbers involved in small-scale artisanal mining in Zimbabwe, the courses' impact has been limited. With the establishment of the Shamva Mining Centre (Zimbabwe), its organizers had hoped that the facility could also serve as a training centre for small miners. The underground mine was to provide feed for the mill, but it was also to be used to train people in safe mining practices. This objective was not realized as water and ore grade problems prevented the mine from becoming functional and from being used as a training facility.

93. In India, where many small mines are operating on a commercial scale, the National Institute of Small Mines (NISM) organized and offered a course for mine owners and non-technical staff to upgrade their understanding of the technical and economic aspects of mine operation and management. The course was taught in the mining district and included mine site visits for the purpose of reviewing and discussing a variety of problem situations in the field.

94. Another approach that has been tried is the training of trainers. In Ethiopia, the United Nations has initiated a project to train 25 government personnel over a four-month period in mining extension and mine development. The concept is that these people will not only act as technical advisers and educators, but also as animators of new ideas and techniques. Equipment is being procured, and audiovisual training materials prepared. Techniques and equipment applications will be demonstrated at operating mine sites.

95. At another level, the Southern African Development Coordination Conference (SADCC) coordinated a three-day workshop on small-scale mining technology, held at Livingstone, Zambia, in 1991. The workshop covered both

economic and technological aspects of small-scale mining and brought together people from government departments and the private sector from around the SADCC region. Many of the lecturers were technical experts from Europe. The objective was to expose key small-mining people in the region to some of the current thinking on finance, law, markets, mining and processing. The material prepared for this workshop will form the basis of a Small-scale Mining Technology Handbook to be published and distributed in 1993.

96. With the objective of improving the level of understanding and practice of artisanal gold miners themselves, a manual explaining and describing the use of simple prospecting, mining and concentrating techniques, as well as safety, environmental protection and marketing basics, was developed for use in the Papua New Guinea context. The book, entitled Handbook of Small-scale Gold-mining for Papua New Guinea (1988, 1992), is written in non-technical language, incorporating common pidgin English expressions; it describes methods, technology and marketing knowledge appropriate to humid tropical and local commercial conditions. Its development, publication and subsidized distribution within Papua New Guinea were sponsored by a number of public and private sector organizations, both local and international, including the Papua New Guinea University of Technology (UNITECH) in Lae, the Chamber of Miners and Petroleum, the United Nations Educational, Scientific and Cultural Organization (UNESCO), the Appropriate Technology Development Institute, Highlands Gold Limited, and Small Mining International. While the Handbook has been distributed to small-scale miners through bookshops and other less formal channels, it has not been integrated into any formal training programmes.

97. Private sector initiatives in this area have included the sponsorship of seminars and short courses and the provision of higher educational opportunities for the children of employees or members. For example, a major equipment manufacturer and supplier in Namibia sponsored a small-scale mining seminar in 1986. Local private and state mining companies provided substantial in kind and financial support for the NISM training seminar in India. Some of the larger Indian companies with small mining operations have implemented scholarship programmes; while in Peru, the Santiago de Ananea Mining Cooperative was able to send a couple of its members' children to the School of Mines at Puno for advanced training.

C. Sources of technology for small-scale mining

98. The lack of easy access to appropriate and affordable technology has also been identified as a constraint on the capability of small miners to improve productivity, resource recovery, working conditions and income generation and to minimize environmental impacts. Efforts to ameliorate this condition have been made at a variety of levels.

99. There are a number of older, more established international non-governmental organizations that have an interest in providing technical support and access to appropriate technology to small-scale miners. These are

/...

the United Kingdom-based Intermediate Technology Development Group and the Washington-based Appropriate Technology Institute (ATI). These organizations have coordinated the publication of handbooks and manuals of direct interest to small-scale miners and have engaged in technology development and demonstration projects at the grass-roots level in Peru, Costa Rica, Zimbabwe and Malawi.

100. In some countries, local universities and mining schools operate laboratories and processing facilities, which are made available to local miners on a cost-recovery or subsidized basis. The School of Mines at Jos, Nigeria, has been concentrating tin for small miners for many years. The University of La Serena, Chile, provided a similar service to area gold-miners, but has recently been negotiating to turn over its processing facilities to a private entrepreneur who, it is to be hoped, will be able to operate the plant on a paying basis. The School of Mines at Tarkwa, Ghana, and the University of Atacama, Chile, for example, have at various times provided lab analysis and outreach services to local miners. These efforts have been sporadic and a function of the availability of external donor agency funding.

101. More often, assay work and metallurgical analysis and advice are offered by appropriate government offices. In Zimbabwe, the Geological Survey Department provides sampling, site evaluation and preliminary mine-planning services; the Metallurgy Department does sample analysis and provides advice on processing requirements and equipment needs. This pattern is replicated in many countries. Given the understaffing and youthfulness that often characterizes such departments, Governments are usually hard pressed to do any more than respond to explicit requests for assistance. The existence of large numbers of small mines in some countries translates into brief and infrequent field visits. If government departments are not overtaxed, it is only because many miners are unaware that such technical assistance services exist, or because they are indifferent, operate clandestinely or are transient. At the regional level, SADCC is now upgrading laboratory facilities in Lusaka, to serve the needs of small miners dispersed throughout the region.

102. Some Governments have or are in the process of creating programmes to make technology available to small-scale miners. A number of Governments, including Zimbabwe, Peru, Chile and Bolivia, have administered equipment-and-plant-hire schemes through various government departments or parastatal organizations. These programmes have also been historically underfunded and under-resourced. While effectively utilized by some miners, the majority of small miners are difficult to reach and have not been well served by such schemes. Often, the equipment packages available have been inadequate or unsuited to their needs. New attempts are now being made in Chile and Ghana, as well as at the regional level (SADCC), to develop more responsive and effective programmes.

/...

D. Role of equipment suppliers and manufacturers

103. Private sector equipment manufacturers have been slow to respond to the needs of artisanal miners. This is not unexpected in the light of the uncertain size and absorptive capacity of the market and the remote and dispersed location of the potential clientele. Local manufacturers and suppliers of simple and semi-mechanized equipment can be found in all traditional and many of the newer mining countries. Local manufacture of more sophisticated processing equipment used by small-commercial-scale miners and processors is found in larger countries such as Brazil, Chile, India and China.

104. Technological refinements to heavy metal separation and placer recovery systems and the continuing interest in gold exploration and development have been a boon to smaller equipment manufacturers in the North. The new equipment, while serving as exploration and assaying tools for larger enterprises, can become production plants for larger artisanal and upscale operations. Unfortunately, the marketing efforts of many of these manufacturers of smaller processing equipment have not as yet extended to parts of the developing world where their technology might find great applicability. But even if the technologies become locally available, in many countries imported equipment is still beyond the financial capacity of artisanal miners to acquire on an individual basis.

105. Recently, innovations in mining and processing equipment have occurred in a number of developing countries. For example, a diesel-powered wet processing machine for alluvial gold ores was developed in Zimbabwe and has been adopted by large mining companies for secondary processing and by small miners for primary production. The machine has been exported for use in a few other African countries. In Ghana, the Small-scale Mining Project has been experimenting with different configurations of riffled wooden sluice boxes and gravity feed-water control systems in order to improve gold recoveries, using locally available materials. A programme is now being developed to facilitate their distribution and use. Local fabricators have also become partners in this effort to develop and diffuse locally built tools and equipment. In a few places, one can find locally modified and manufactured variants of northern-developed semi-mechanized and mechanized technologies. These have been introduced with varying degrees of success in terms of performance, maintainability and cost efficiency when compared to the original.

106. Commercial-scale equipment manufacturers, whether based in the North or the South, have generally preferred to direct their technological research and development efforts to the larger, more transparent market-place, including the small commercial miners. Portable crushing, grinding and milling plants and modular mills are now custom designed and manufactured in Africa to local specifications. The supply and distribution networks of the larger northern-based mining equipment manufacturers are well established to service the needs of their primary client base. The presence of drill and compressor manufacturers or suppliers in developing countries with established medium- or large-scale mining sectors has also worked to the benefit of small commercial producers as well as artisanal miners in some cases.

107. Recognizing the diversity of experience, technology and engineered solutions that can now be applied to the solution of technical problems even at the small scale, a few development organizations have made an effort to diffuse awareness and understanding of currently available technologies and their applications as widely as possible. In 1990, Intermediate Technology Publications (United Kingdom), with financial support from the International Development Research Centre (Canada) and the Commonwealth Science Council (United Kingdom) published Small-scale Mining: A Guide to Appropriate Equipment. It is basically a compendium of equipment identified and regarded to be potentially useful to both artisanal and small commercial miners. A second publication, commissioned by GTZ, entitled Tools for Mining: Techniques and Procedures for Small-scale Mining, was released in German in 1991, with Spanish and English versions due out in 1992 and early 1993. The information on different pieces of equipment and processes is structured and presented in a way that would assist the user to identify alternative solutions to field problems.

108. These publications are being widely distributed. Without monitoring and/or correlated training or dissemination efforts, it is not at all clear how effective these documents have been or will be in diffusing new knowledge and technical understanding to the parties that could most benefit from their application.

V. PROMOTION OF SMALL-SCALE MINING

A. Importance of small-scale mining in rural development, improvement of living standards and distribution of income

109. One of the strongest arguments for the preservation and strengthening of artisanal mining is its potential to contribute to rural development and to improve standards of living. Such mining activities can provide a basis for other economic activities, contribute to the development of community infrastructure and lead to improvements in the quality of life of workers, their families and the community at large. In many areas, it is already serving the vital function of maintaining the ability of rural communities to survive in the face of extended drought, economic recession and adjustment conditions.

110. The opportunity to engage in such activities must be legally secured, including guarantees against alienation without equitable compensation and/or continuing participation. Unless this situation is clarified, the impact of commercial mine development on traditionally artisanal mining areas will become an issue of increasing concern, escalating the potential for confrontation and disorder.

111. The most important technological innovation in larger-scale mining, cyanide heap leaching of precious metal ores, is one that has impacted artisanal miners adversely. Its successful implementation in humid tropical

/...

environments and at high altitudes resulted in the widespread expansion of its use on a commercial scale in a number of African and South American countries. New large mines were developed on sites often being worked by artisanal miners illegally, resulting in their displacement or conflict (e.g., Andacollo, Chile; Bizkaitarra concession, Venezuela). In central Luzon, the Philippines, the opening of a large surface mine has created tension because it will lead to the dispossession of thousands of "pocket" miners. A riot at a new commercial diamond mine in Guinea erupted over the issue of traditional mining rights of the local population. Violence led to the closure of the Mount Kare gold-mine in Papua New Guinea. Although the mine was itself a joint venture between a major multinational mining company and traditional landowners, a dispute among the local population over the composition of the landowner company led to the shut-down of the operation. The legalization of artisanal mining is a necessary but not the only condition required to ensure the realization of its full positive potential. Legalization only establishes a foundation for further constructive action. Major difficulties often continue with respect to employment opportunities, income generation and distribution. Many formalized local operations remain economically and technologically marginal. Mineworkers often receive substandard wages, below those posted for state and/or privately owned larger mines. Even when miners are organized as cooperatives, inequities may exist within the internal structure of the co-op. Alternatively, the income-generating capacity to raise wages may simply be absent. These continuing problems highlight the importance of creating conditions, additional to a legal framework, for the rationalization and upgrading of artisanal operations.

112. An understanding of the current state of affairs with respect to a wide array of economic, organizational and technical matters is critical. These include management organization; business practices and standards; labour utilization and wage practices; mining, processing and marketing knowledge; income-distribution patterns; individual and community spending, savings and investment patterns; any backward or forward linkages/value-added activities within the rural and national economy; changes in living standards and quality of life attributable to the activity; its effects on existing social, political and economic relationships and activities within the rural areas; the total value added as a result of artisanal activities; contributions to foreign exchange earnings and any leakage problems; marketing systems; modes of acquiring finance, equipment and supplies; and national raw materials sourcing policies and supply arrangements. In many countries, this basic information has yet to be assembled, correlated and analysed.

B. Markets and marketing

113. The viability of small-scale mining depends on the ability of the producer to effectively deliver the product in a marketable form to consumers/buyers, wherever they may be. For some commodities, demand is international but concentration or additional processing may be required. For other minerals, local demand exists or can be created.

114. At the international level, the small-scale producer is rarely in a position to deal directly with end-product consumers in foreign countries. Usually, the product is moved through intermediaries, including state processing and/or buying agents, national banks, registered international and local dealers, and even illicit traders. This is often the case for concentrates of precious and strategic metals, and precious and semi-precious stones in rough form. When this happens, the principal concern is a price in a currency that permits the small miner to recuperate investment and operating costs and maintain plant and facilities. In the case of some metals, concentrates are not smelted nor are they purchased locally. Artisanal miners cannot operate in this kind of situation because their success or failure is tied to their ability to identify and secure delivery contracts with offshore smelters. This has become increasingly difficult in recent years, with many custom smelters refusing to offer long-term (two-three year) contracts and becoming more selective as to concentrate qualities and quantities. This has resulted in small commercial mines having to settle for month-to-month contracts, short of shutting down altogether. In either case, the small miner is a price taker and does not usually have the ability to influence international supply or demand or prices.

115. Given the recent collapse of a number of state buying agencies, the promotion of small-scale mining for internationally traded mineral commodities requires careful assessment of the international market-place and existing international and local trading channels. Alternative mechanisms may have to be promoted, such as marketing arrangements with medium and large commercial mines, or existing parallel structures may have to be formalized, registered and strengthened. Particular efforts may have to be made to identify and attract potential new buyers and legitimate merchants of specialty ores, metals and gemstones. New ways will have to be found to bring legitimate buyers closer to the miner.

116. For mineral commodities for local consumption, either as raw material for local industries or to be further processed and finished locally before sale abroad, it is incumbent on the national Government to assist in the promotion and development of local end-user markets and value-added forward industries. In some countries, artificial barriers to local market sales of mineral products exist and will have to be eliminated or eradicated. Such is the case of prohibitions to the ownership and sale of rough gemstones by individuals, or where the import of industrial minerals occurs at the expense of local sourcing, because of clandestine foreign currency transactions between foreign suppliers and local consumers.

C. National approaches

117. Governments have the power to rebuild investor confidence and establish the "enabling" legal, institutional and fiscal conditions to promote small-scale mining at both artisanal and commercial levels, by:

/...

(a) Recognizing and allowing for some of the subsector's distinctive characteristics within mining codes, environmental regulations and fiscal regimes, including security of tenure for both artisanal and commercial miners;

(b) Establishing juridical mechanisms for conflict resolution between mining interests, Government and miners;

(c) Simplifying registration, reporting and compliance procedures;

(d) Implementing fiscal inducements, such as tax holidays and import duty waivers during the mine's or the miner's start-up period; and when taxpaying commences, lifting or limiting restrictions on foreign exchange retention.

118. Where the current level of activity or growth potential of the subsector warrants it, government small-scale mining project units, or independent development companies, should be established to evaluate current and potential problems, to propose and implement ameliorative programmes and projects, either on their own or in collaboration with international or local non-governmental organizations or agencies. Where the potential is more limited, at least one government department should be assigned the responsibility for promoting and supporting small-scale enterprise in the mining sector and given the tools and budget to service the subsector. In other words, responsibility and effort should be consolidated and better focused.

119. Part of the mandate should be to identify deposits amenable to small commercial mining or for artisanal workers. In fact, concession areas or "mining reserves" for artisanal miners should be established and technical assistance provided to undertake preliminary reserve evaluations for both loan application and mine-planning purposes.

120. Governments may wish to consider the possibilities of:

(a) Sensitizing banks and international donor agencies on the measures being taken to foster small-scale mining;

(b) Organizing cooperative production units and support groups or associations of producers;

(c) Supporting the initiatives of both local and international non-governmental organizations in the subsector, with respect to training, financing, technology development and diffusion, information gathering and dissemination, and marketing; for example, in India, the National Institute of Small Mines, and at the international level, Small-Mining International (Canada), the Intermediate Technology Development Group (United Kingdom), Appropriate Technology International (United States of America), and the German Appropriate Technology Exchange (GATE);

(d) Creating vocational mining schools or new programmes within existing schools in both mining and urban areas, to promote and improve indigenous miners' mining and management skills and entrepreneurial interest in the subsector, with ongoing extension and field training offered to working miners;

(e) Establishing technical support facilities, such as assay and metallurgical labs, either as part of small-scale mining projects, vocational schools or universities, or as special arrangements with private independent or company labs;

(f) Encouraging local private entrepreneurship in mining tools and equipment manufacturing for the subsector, with credit facilities made available to allow for the promotion of borrow to buy, or lease to buy schemes. (For the smallest producers, equipment sharing or pooling projects could be attempted.);

(g) Promoting local financing facilities operated on a commercial basis, in the form of small enterprise banks, national development banks, private banks, or non-governmental organization revolving loan funds;

(h) Promoting domestic investment in the subsector, for example the development of a local stock or equity market in order to formalize a mechanism for raising local risk capital;

(i) Promoting partnership arrangements between Government and the private sector and between indigenous and foreign entrepreneurs for the production, processing and marketing of minerals.

D. International cooperation - private sector

121. While the promotion of local private investment, ownership and management of small mines should be a priority in the developing countries, opportunities in this field should also be extended to foreign-based capital and entrepreneurship. Local experience and capital availability may be insufficient to achieve the levels of sector development possible. The foreign-based private sector can play a constructive role in the promotion of a small commercial mining industry, and can also collaborate in the upgrading and improvement of artisanal activity. Possibilities for their direct involvement in mine development and operation on the small scale may be limited because their own interests and scale of operation are typically larger, but once established in a developing country, their activities can have a positive influence and impact on smaller operations.

122. Cooperation can occur in a variety of ways, including:

(a) Joint venturing with local entrepreneurs and companies, not only in mining projects, but also in the provision of supplies and services to the industry;

(b) The promotion of complementary work and marketing relationships with indigenous small-scale producers, which could be extended to assaying services, technical assistance and advice, equipment loan and training;

/...

(c) The lending of technical and management expertise to both government and small producer associations or collectives, especially in countries where the level of commercial mining activity has resulted in a local shortage of skilled engineers and geologists;

(d) The voluntary return of mineralized areas that are marginal or too small to mine economically using industrial methods, along with all of the geological and technical data that has been generated;

(e) Collaboration in the establishment of demonstration projects and training programmes or schools;

(f) Joint or sole sponsorship of small-miner awards, mining competitions, seminars and scholarships.

123. In the case of equipment manufacturers, other options are opportunities for licensing and training of local manufacturers for the provision of certain types of products.

E. Role of the international community

124. The promotion of small-scale mining at the international level can most effectively occur in the areas described below.

(a) Mineral inventories and computerized databases

125. The United Nations is already supporting efforts to complete basic exploration and survey work in selected countries. A computerized database is being established in the United Republic of Tanzania. Wherever these programmes are in place, attention should also be paid to identifying deposits and areas amenable to small-scale development. In countries where the potential for the creation or expansion of small-scale mining is great, one or two pilot projects could be undertaken to identify, inventory and complete preliminary technical and economic evaluations of small-scale mining zones or reserves, thus providing a reasoned and planned database for future development. Successful projects could serve to direct mining activities to pre-defined and evaluated areas, and, it is to be hoped, minimize the risk of the haphazard, ad hoc spread of artisanal operations.

(b) Basic research and technology development

126. It is necessary to promote and support research, development and diffusion of technology improvements, and of modified or new working methods and practices, that will reduce physical impediments to women's participation in all aspects of mine labour and operation.

127. Understanding of many basic aspects of small-scale mining activity and problems is still lacking. Basic data on the nature and extent of small-scale mining activities, on environmental and social impacts, on the current role of

women and children, and on technological and marketing problems need to be gathered for most countries. International coordination and funding of research efforts, synthesis and analysis of local studies and recommendations can greatly assist local and regional efforts to evolve effective intervention and support strategies. The development and field testing of different techniques, equipment and processes should be undertaken and partly sponsored by the international community.

(c) Training

128. A serious need currently exists for training/educational materials and structured programmes directed at increasing specific skills and knowledge at a variety of levels, including miners, managers, entrepreneurs, regulators and the general community. Training efforts that have been made in various countries, along with their results, need to be reviewed and evaluated for effectiveness and focus, and their strengths and deficiencies identified. Such a review can become the point of departure for developing flexible educational strategies and materials, which can then be modified to address local needs and problems. Technical areas of concern range from basic geology and surveying to mining and processing practice, industrial safety, ground control and environmental protection, mine accounting and management, and minerals marketing, and are all themes that can be addressed at the international level. Training efforts should be limited to pilot programmes in selected countries and potentially the training of training and extension specialists at the international level.

(d) Information flow

129. A major problem facing small-scale mining entrepreneurs is a lack of access to current information about marketing possibilities, sources of financing, technology and expertise, investment opportunities, and training programmes at both the local and the international level. While the International Agency for Small-scale Mining (Small Mining International) has recently initiated the development of a computer-based information system to meet this need at the international level, additional collaboration and assistance at the international level are required to ensure that critical information is gathered and effectively disseminated. In this case, national as well as international organizations (e.g., United Nations, ITDG) are important parts of the process. The United Nations, with its vast interface with many countries, can usefully participate in both the collection and the dissemination of information.

130. To that end, the United Nations, in conjunction with the Government of Zimbabwe and the active participation of non-governmental organizations, is organizing a seminar at Harare in February 1993 on guidelines for the development of small- and medium-scale mining, with emphasis on the developing countries. By presentation and discussion of case-studies and successful examples of small- and medium-scale mining activities, guidelines will be identified to assist and inform those countries on approaches to development. The issue of women in mining is included as well as fiscal, social, legal,

/...

technical, environmental, financial, marketing, investment and governmental support aspects. The guidelines formulated will be published and circulated widely in the developing countries.

(e) Institution strengthening

131. There is also a need for international collaboration in the strengthening of local educational institutions, miners' associations and research organizations. These efforts can take the form of direct assistance programmes, jointly run and financed projects, networking, and international gatherings at which local institutions are provided with the opportunity to share their own experiences and learn from those of others, as well as being able to participate in workshops structured to address informational and organizational needs. The United Nations, through its institutional strengthening activities, is continually undertaking such activities to enable government institutions to provide assistance directly to local institutions.

(f) Financing

132. The international community has already begun to take initiatives in the area of providing revolving loan and credit facilities for the upgrading of small-scale mining operations in a limited number of countries. Development banks and development agencies, as well as charitable organizations, have been involved, but progress in this area has been slow. There is a continuing need for expanding assistance and support in this area, which cannot afford to be ignored for much longer. Small-scale mining is an income- and employment-generating activity that has the potential to operate more productively and efficiently given the proper support. The provision of funds to small enterprises should not be treated as grants but rather as working loans for the upgrading of operations. Local shortages of funds for this purpose should be supplemented with international monies; otherwise a serious obstacle to upscaling and transformation will become a permanent blockage.

(g) Investment promotion

133. International and regional organizations should continue to be involved in promoting foreign investment in the mineral sector of developing countries. However, special attention must also be given to investment promotion for the subsector, whose needs have often been neglected or ignored at past investment forums. Mechanisms for promoting, implementing and securing foreign investments in small-mining ventures in the developing countries are not well defined, and investment at this level is often difficult to identify. Small Mining International has begun to serve as an informal clearinghouse for information on investment opportunities, but more formal efforts are required. It might also be worthwhile to explore the possibility of establishing an insurance and advisory service for small investments, similar to the Overseas Private Investment Corporation (OPIC), at the international or regional level.

/...

VI. CONTRIBUTION OF WOMEN IN SMALL-SCALE MINING

A. Present role of women

134. Women's participation in small-scale mining, while growing, is still relatively limited. While women are involved in almost all aspects of small-scale mining - entrepreneurial, production, marketing and support services - certain roles and functions remain closed or greatly restricted to them. Apart from the difficulties that all small-scale miners face, the additional obstacles to full participation that women face are sometimes legal, but more often are of a cultural or social nature. Women have entered this subsector not necessarily as a matter of choice; in many places, they have been pushed by economic reforms, drought, recession and deepening economic marginality to find supplemental or alternative ways of supporting their families.

135. It is not yet possible to quantify or even to understand, except in the most general and qualitative terms, the reality of women's participation in this subsector. National statistics, where they exist, do not survey workforce participation on the basis of gender. Social and economic studies of small-scale mining at both the macro and the micro-level are few, while gender aspects and issues have just begun to be explicitly addressed.

136. But wherever small-scale mining is practised, women are either directly involved or indirectly impacted in one way or another. The nature and extent of participation vary from country to country, but the various modes of participation can be generally defined as follows:

(a) As entrepreneurs - as concession holders, investors, financiers, equipment brokers; provisioners of mining and/or general supplies, and of catering services;

(b) As production workers - in panning, digging, washing of ores; manual breaking, screening, sorting, bagging; scavenging mine dumps; reworking tailings;

(c) As mine support labour - in manual portage of ores and concentrates to nearby crushing, processing and shipping points; as gang or group cooks;

(d) As management staff in cooperative and small corporate organizations - as administrators; bookkeepers; supply clerks; salespeople; secretaries;

(e) As independent mineral traders and buyers;

(f) As fabricators - usually of ceramics and sometimes of jewellery, including gem-cutting (India).

137. In Africa, women work in any of these modes. In Latin America, women primarily assume production, support ard, in the case of cooperatives,

/...

management roles. Participation as entrepreneurs and traders, except perhaps in the supply of non-industrial support services and goods, is limited. In Asia, women are probably involved in all of these areas, but the distribution of participation among and within modes seems to vary dramatically from one country to the next.

1. Artisanal mining

138. Women are actively engaged as both part-time and full-time miners in the informal sector. They are directly involved in the production process but are restricted to surface and alluvial workings by custom or law. As artisanal miners, they work as individuals, in small family groups, in groups with other women, or as part of cooperative ventures. They are not usually registered or licensed, but their situation is no different from that of their male counterparts. The level of participation is particularly high in areas where the mineralization can be most easily accessed, mined and prepared for market, using the simplest and least costly of tools. This means working surficial deposits of precious, strategic and industrial minerals, on which simple concentrating methods, such as gravity or visual separation of the marketable mineral product, can be used. Common activities include panning for gold in or along rivers; washing and sorting of diamond-bearing gravels; digging for gemstones and potting clays; hand cobbing of chromite; breaking stone into aggregate; scavenging the waste dumps of large and medium-sized mines; and reworking (panning) the gold and diamond tailings of others. Large numbers of women can be found working in these ways in Bolivia, Ghana, Zimbabwe, the Philippines, Myanmar and other countries.

139. Women also work as porters, manually transporting sacks of preconcentrate or sorted ore to either the river for further concentration or the roadside for sale or pickup. They are employed for that specific purpose or they do it as part of their own mining activities, or those of the family. In areas where underground mining is prevalent, this is one of the few activities in which they can be involved.

140. Women also provide essential secondary services, as caterers, merchants, and equipment lessors, and as financiers and buyers, either licensed or illicit, of the mineral product.

2. Semi-mechanized mining

141. On the more commercial scale, women are employed by mine owners to work in both primary and secondary production activities. At surface metal mines, where selective mining of the ore is desirable, women are employed to break, size and sort already exposed ore using simple hand tools (e.g., India). At quarries, they carry stone to the crusher, crushed stone to the stockpiles, and bag product for sale (e.g., Nigeria). At underground base and precious metal mines, women are employed on the surface to hand sort and stockpile run-of-mine ore (e.g., Bolivia). They may also assist in ore processing, and in the case of gold, for reprocessing runoff containing the fines (e.g. the Philippines).

142. Job opportunities are sometimes provided in the camp kitchen or office, or in other community facilities operated or supported by the mine. In certain instances, women have acceded to senior administrative positions, especially in the better organized cooperatives.

143. In a number of countries (e.g., Ghana and Zimbabwe), women have become legal concession holders, with rights to mine deposits of granite, gemstone and gold. They have registered as individual owners, as partnerships, and in a few cases as cooperatives. For the most part, their goal has been to develop semi-mechanized commercial operations. This has been achieved in Zimbabwe. In other cases, operations have not been able to progress beyond a manual level or deposits have remained undeveloped and concessions eventually relinquished. Of all the roles that women have assumed in this subsector, that of mine owner/promoter has been the most difficult to realize successfully.

B. Constraints to the participation of women

144. The problems that women face are not necessarily particular to their gender. However, owing to their relatively disadvantaged position vis-à-vis certain resources, such as education and capital, women are likely to be more seriously hampered by them. Other problems, such as cultural taboos and the time and mobility constraints imposed by domestic responsibilities, are gender specific. For women to be able to participate more fully in the new opportunities, the most debilitating constraints will need to be clearly identified, understood and ultimately neutralized.

145. Problems and constraints should be understood in terms of the ways and extent to which they adversely affect the ability of women to perform in their own preferred areas of work and income generation. For example, in the majority of countries, women are barred by custom and even by law from working underground. In India, large numbers of women and children used to work underground in the country's coalmines. With independence, new labour laws have prevented the exploitation of women and children in the workplace. Now the use of female and child labour in underground mines is prohibited. In many other countries, custom and superstitions rather than law prevent women from working in or even entering underground mines. More critical to their present condition is the fact that, in some places, women are prohibited from even entering onto or near a concession area during menstruation, thus reducing their potential earnings by approximately 20 per cent. Similar superstitions have prompted mineworkers to try to bar female mine owners from their own properties. Progress on this related issue will yield immediate economic as well as social benefits to women.

146. Certain constraints are common to all women working in the subsector, whether as entrepreneurs or labourers. These would include the difficulties of balancing domestic responsibilities with work requirements and of dealing with historic cultural biases and superstitions. Most women investors are urban based. Proper supervision of an operating mine means long periods of

absence from home, which entails the logistical difficulties of organizing proper child care and other domestic duties and income-earning activities. The difficulties incurred have served as a deterrent to some. For women mineworkers who live closer to the mine site, balancing the needs of children and the home with the requirements and rigours of employment is not as trying or problematic as for the investor group. As for the self-employed merchants, caterers and traders, their situation is more manageable, given their flexibility to shorten hours at the mine site, and in some cases to open shops in markets nearer to home.

147. The financial constraints are different for the various modes of participation. In the case of mine labourers and employees, their concern is payment for services rendered, at a level and on terms that make employment economically worthwhile. Often, women are paid sub-economic wages, less than male counterparts for equivalent work, and are the first to be laid off. In the case of hawkers, caterers and equipment lessors, renting or selling on credit comes with no guarantee of future payment. For concession holders, the problem is access to sufficient start-up and working capital. This is partly because of the lack in some places of a reliable and accessible market where products can be sold on a regular basis and fair payment received in a timely fashion. For both women concession holders and illegal artisan miners, the finance/marketing problem can sometimes be circumvented by dealing directly with clandestine buyers who purchase products in the field and pay in cash, equipment or supplies up front.

148. The lack of technical skills and training affects the entrepreneur's ability to identify good properties and develop and run them effectively. The entrepreneur depends on the advice and goodwill of experienced employees and government-employed experts willing to assist. A similar lack of skills reduces the ability of the artisanal miner to exploit her deposit efficiently and safely, with a minimum of environmental damage. Other problems include literacy levels and the ability and patience to deal with bureaucratic permitting procedures, physical exhaustion and exposure to health and safety hazards etc. that may be more debilitating for women than for men.

C. Women and the environment

149. Women involved in small-scale mining have their most direct impact on the environment as concession holders and mineworkers. As concession owners, they directly influence the ways in which their own operations are conducted. As mineworkers, they knowingly or unknowingly use mining and processing techniques and work the deposit in ways that are environmentally damaging, and at the same time expose themselves to environmental hazards.

150. The issues here are not economic. The environmental damage inflicted by small-scale artisanal and mechanized operations often occur as a result of the misapplication of technology - using wrong or incorrect equipment or processes or by carelessness in the handling of toxic reagents. Problems also arise because of a lack of appreciation of the hazardous nature of certain chemicals

/...

and procedures and a lack of familiarity with the technical alternatives available to minimize adverse environmental effects and the know-how to implement them. Nor has it been common practice to reclaim disturbed areas as mining proceeds. Thus, women are not any more disadvantaged than men. The difference lies in the relative seriousness of the short- and longer-term impacts that environmental and safety hazards may have on women and their offspring, such as exposure to mercury and other toxic chemicals. Greater sensitivity to, and familiarization and understanding of, these hazards will be required.

D. National policies for future action

151. Many of the problems that women have in becoming fully functional and effective in small-scale mining reflect the generic resource deficiencies that tend to characterize the subsector as a whole. As noted above, the problems of women are often complicated and accentuated by their relatively disadvantaged situation with respect to these already scarce resources, but such difficulties must also be understood with reference to the historic economic and social position of women within their own countries and cultures.

152. Efforts to develop national policies of action specific to women operating in this subsector must recognize and account for local realities. A major role of Governments will be to ensure that gender issues are incorporated into the country's political agenda and that any existing legal restrictions on women's participation in mining are removed. Whether a Government is able to effect significant change and improvement for women in small-scale mining is another matter, tied as much to its willingness and ability to marshall additional resources to promote and strengthen the subsector as a whole. This is why such initiatives should not be left solely to the prerogative of Governments, whose financial and administrative resources are typically stretched to the limit. Non-governmental organizations, public institutions and the private sector also need to recognize that they have an important and constructive role to play in this process.

153. National initiatives need to redress the information gap with respect to women. They need to assist in the design and implementation of strategies for shaping conditions that will allow for a greater and more effective participation of women at all levels. This work can and should proceed irrespective of the state of efforts to ameliorate conditions across the subsector, although progress for women will ultimately be constrained by the lack of progress on the broader front. There are a number of specific policies and related actions that could be implemented immediately within a national context. These would include commitments on the part of Government, national development groups and the private sector to undertake the activities discussed below.

(a) Collecting and analysing information on the gender aspects and issues associated with small-scale mining

154. This work could start with collecting and reporting subsector statistics on a sex segregated as well as an aggregate basis, using a basic needs assessment survey, followed by more detailed studies by local and foreign-based universities, assistance groups and agencies. Such analyses can provide an informed basis for further policy formulation and intervention, and also facilitate the identification of target groups of women in need of special assistance.

(b) Identifying, encouraging and organizing target women groups

155. This is a critical element of effective programme implementation. Given the scarcity of resources available for the development of the subsector in general, the numbers affected by any programme initiatives would be enhanced by encouraging the organization of women into groups or associations for the purpose of programme delivery. Such groups can also assume critical mutual support and reinforcement functions in areas of labour and entrepreneurism. Apart from serving as recipients for the communication and delivery of externally generated ideas and programmes, these groups could also become active agents of change and self-help and improvement in their own right - organizing support and technical services for their membership, such as child care, literacy courses, legal assistance on permitting and other regulatory requirements, management and tax counselling, training courses for both claim holders and miners in basic geology, mining, health and safety, environmental protection and management techniques and practices. Organized groups have the potential to represent membership needs and interests to Government, to lobby for change and to secure a broader understanding of women's concerns in the community as a whole. The organization of such groups is also important because sometimes women's concerns get lost in larger umbrella organizations, such as miners' unions and small-scale miners' associations.

(c) Educating the community and promoting opportunities for women in the subsector

156. Not only do government and mining industry service organizations need to be better informed about the special challenges and difficulties facing women who choose to act in that subsector, but also the general public and the mining community must have their awareness raised. Government field geologists, mining technicians and engineers, who can be of direct assistance to women claim holders and artisan miners, need to be especially sensitized. Some of the problems that women are struggling with relate directly to customs and belief systems deeply ingrained in local cultures and mining communities. Educational campaigns in the mining areas must be designed to introduce new ways of thinking about women's work and role in mining.

157. Special efforts should be made to attract young women into the formal study of the technical and economic aspects of mining. Technical schools and universities should provide opportunities and encouragement to women to study

/...

geology, surveying and mineral engineering. Women should be encouraged in those areas of endeavour where they can build on traditional skills, such as the provision of services and goods, the buying or trading of produce, and the financing of equipment and operations, and mechanisms should be established to mitigate the additional financial risks they might bear as women.

(d) Delivering key support services that will facilitate women's entry and effective participation in the subsector

158. Government should take a lead role in encouraging or mandating the provision of child-care facilities, secured areas for children and first-aid facilities at more organized sites. Field schools and extension services (technical/management) designed to meet the specific needs of women miners should also be organized with the assistance of Government, but not necessarily by Government. Such efforts could be sponsored by non-governmental organizations or coordinated by associations of women miners or small-scale miners associations themselves. Well-organized non-governmental organizations and agencies could work closely with Government and the commercial sector to set up credit and loan facilities and shared equipment pools.

E. Proposals for international cooperation

159. At the international level, there is considerable scope for cooperation and collaborative initiatives between development agencies, national Governments and institutions and non-governmental organizations. The United Nations can play a coordinating or catalytic role in this respect, which it has already begun with activities undertaken by the United Nations Development Fund for Women (UNIFEM), the International Research and Training Institute for the Advancement of Women (INSTRAW) and the Department of Economic and Social Development of the United Nations Secretariat.

160. Given the lack of basic information and documentation, the collection of primary field data, as well as formal investigations of gender aspects and issues within the subsector, are urgently required. While much of this work has to be done at the national and local levels, these efforts should be encouraged, monitored and to some extent even coordinated at the international level. To promote and reinforce nationally sponsored efforts, a foundation study on women in small-scale mining would be justified. The objectives of such a study would be to establish and refine data-collection procedures, to identify and clarify both general and researchable issues, to train field researchers capable of dealing with the complexities of the issues, to develop and analyse a preliminary database that is international in scope, and to recommend policy directions. This effort should be followed up with the establishment, training and financing of an ongoing international research network concerned with data collection, analysis, and policy development on gender issues in small-scale mining. Organizations such as UNIFEM are particularly well positioned to coordinate such a study. UNIFEM and INSTRAW are already implementing a pilot project in three regions and six countries to try out procedures that can later be applied to other countries.

/...

161. Other initiatives could include:

(a) The identification of individuals, institutions and programmes at the local, regional and international level to which women can turn for different types of assistance and advice;

(b) The identification and development of demonstration projects that could be executed with the assistance of technical assistance organizations through the United Nations, and/or northern country agencies, and that would attempt to address some of the educational, technical and organizational constraints or deficiencies under which women operate in various countries. For example, at the recent DESD/INSTRAW workshop on women in environmentally sustainable development, held at Beijing in September 1992, four proposals for replicable mining projects involving women's participation in mining were presented for donor funding;

(c) The promotion and support of research, development and diffusion of technology improvements, and of modified or new working methods and practices, that will reduce physical impediments to women's participation in all aspects of mine labour and operation.

VII. ENVIRONMENTAL CONSIDERATIONS

A. Legal and social considerations

162. Small-scale mining shares with its larger-scale counterparts a number of adverse impacts on the environment, including land degradation, deforestation, deterioration of surface-water quality (by addition of suspended solids, heavy metals and toxic chemicals), and disturbance of river-banks and river-beds. There continues to exist a considerable degree of controversy and disagreement concerning the extent of the environmental risks posed by small-scale mining. Certainly, small private companies have not always been very responsive to environmental concerns, and it may not be possible to expect artisanal miners to adhere to a rigid set of environmental standards. However, the extent of the damage inflicted may in fact be relatively modest compared to larger operations; damage is not necessarily irreversible, and its potential for natural attenuation may be as much a function of local climatic and topographic conditions as of the practices employed by the small-scale miners themselves.

163. Where small-scale mining becomes environmentally problematic is when activity becomes highly intensive in a circumscribed area, that is, "mineral rush" situations. Under such circumstances, many of the participants are not serious or experienced miners, nor are they particularly concerned to respect pre-existing rights or uses of land. Impacts on the bio-physical environment are concentrated and direct, brought about by the high level of ad hoc, unplanned and sometimes dangerous and irrational mining. Such has been the case with alluvial gold-mining in the Amazon basin, where river systems have been unduly contaminated with mercury as a result of its reckless use in the

gold amalgamation process, and riverine environments widely damaged by uncontrolled mechanized stripping of river-banks and river-beds. Both manual and mechanized mining operations have contributed to these problems.

164. "Rushes" can also have severe social consequences. The most disturbing involve the dislocation of existing communities and the unlawful alienation of land, the creation of shanty town mining camps and the spread of social disorder, corruption and exploitative labour practices. In a number of countries, "first world" peoples have been threatened and their communal integrity endangered. This became a major concern with the expansion of the Brazilian gold-rush to the state of Roraima in 1987. Garimpeiro miners encroached on native lands and spread disease among vulnerable native communities. The situation became so explosive that the national Government was finally forced to take decisive action in 1990 to curb garimpeiro activities, including destruction of air strips, physical eviction, and new enforced legal protection for native reserves. These actions alone led to a major reduction of garimpeiro activity and production of gold from Roraima in 1991. However, an indirect effect of the closure of Indian lands to mining activity was the spread of illegal mining across the border into Venezuela.

165. A distinction must be drawn between "mineral rush" situations and normative small-scale mining activities. In the case of the latter it is recommended that a multiple-stage approach be taken, in which the initial aim of both Government and the community at large should be to promote adherence to minimal safety and environmental protection standards, rather than to impose model standards that may be too costly and technologically impossible for the miner to achieve at his or her current state of operation. Regulations should be constructed so as to minimally secure the integrity of the workplace, while facilitating the recycling of water and the containment of any toxic reagents or waste materials resulting from mining. The potential would then exist to increase regulation and mitigation efforts after the financial viability of the operation is established. In Ghana, the Government has for the time being accepted the non-performance likelihood of artisanal operations as far as reclamation is concerned. It has instead chosen to withhold a small percentage of the payment on product sales from the artisanal miner, which sum is deposited in an environmental rehabilitation fund, with the Government assuming ultimate responsibility for reclaiming abandoned areas. Minimal safety standards are upheld and technical assistance provided to improve mining practices and minimize environmental damage.

166. It should also be noted that legalized cooperative and small entrepreneurial mining can contribute positively to the economic stabilization and further development of the social and physical infrastructure of local communities. Miners' cooperatives in Africa and Latin America have been involved in the construction of a variety of community facilities, including waterworks, clinics and schools.

167. In the case of existing or potential "mineral rush" situations, there is little that can be done to prevent their occurrence. Under such circumstances, the strategic objectives are to normalize conditions as soon as

/...

possible and/or to divert activity to designated areas whenever possible. This requires somewhat of an anticipatory response on the part of Government and other concerned organizations. This has been difficult to achieve even in the industrialized countries, where mitigative measures and services have tended to follow, rather than precede, "rushes" to rapidly develop an area's mineral resources. The resulting conditions have been referred to as the "boom-town syndrome", and require a host of backup social services and new infrastructural development to remedy them.

168. In Zimbabwe, illicit artisanal activity along certain river courses has reached "gold-rush" proportions during recent years. The Government recognized it had a potential environmental disaster in the making and moved swiftly to establish a regulatory framework that would facilitate supervision and the minimization of environmental damage from manual mining along public waterways. It gave local councils an economic stake in the control and supervision of local artisanal operations. In an attempt to reduce adverse social impacts, mining rights have been limited to local residents. There has been some resistance on the part of the local councils to assuming their new responsibilities related in part to their reticence to be involved in monitoring an activity of which they have little or no technical knowledge or understanding. If the problems can be resolved, a workable mechanism for dealing with future "mineral rush" situations will have been established.

169. As regards formal industrial mining operations, detailed regulatory and institutional frameworks as well as rigorous environmental standards have evolved in most industrialized countries. The process of establishing and maintaining the environmental acceptability of mining projects extends over the entire life cycle of the mine, even thereafter, and can be divided into three phases:

(a) Permitting and environmental impact assessment, involving the screening and evaluation of a proposed project during the initial planning stage by a regulatory agency; this should be based on an array of studies and plans prepared by the mining company and independent consultants and culminating in the approval or disapproval of the project subject to the implementation of mutually agreed or legally specified waste management schemes, monitoring programmes, closure plans, and mitigative measures or design modifications related to either environmental or social impacts or both;

(b) Compliance with permits and regulatory standards during the active development and operation of the mine; this involves continuous monitoring of operations, maintenance of contamination and pollution-control measures and technology, and adherence to all approved procedures and plans;

(c) Closure of the mine and reclamation of the site.

170. Developing countries have only recently begun to pay serious attention to environmental and social impact issues associated with industrial-scale mining. New policies, regulations and institutions are just emerging. While policies must ultimately address environmental and social concerns associated

with all these phases, there is no consensus on how extensive and rigorous the regulatory framework should and can afford to be. In fact, there is some concern about the appropriateness of adopting standards and procedures mirroring those of industrialized countries. The argument is already being made that they would not only be administratively and technically unmanageable, but would also create new costs and procedural barriers to investment and mineral development on any scale.

B. Cost implications in mining development

171. In the industrialized countries, the additional costs imposed by environmental regulations are incurred at all stages of project development and operation and cover such items and activities as posting of reclamation bonds, reclaiming exploration sites, advance mitigation work at sensitive sites, public relations, environmental baseline studies, water quality control plans, reclamation plans, legal representation, design and construction of containment facilities, monitoring equipment acquisition and set-up, tailing, waste management and sampling programmes, and erosion and dust control. At the mine's end, there are the final phase costs of plant decommissioning, removal of equipment and facilities, site stabilization and revegetation, and post-mine water quality monitoring. There may also be additional cost burdens associated with the mitigation of adverse social impacts, potentially including town site relocation and/or construction, compensation to local landowners, construction and maintenance of social services and community facilities, creation of alternative employment opportunities etc.

172. The extent of the environmental protection measures required and their associated costs are a function of the mining and processing methods, and the equipment and reagents being used, as well as of the fragility of local ecosystems, the abundance and quality of local water and soil regimes, and their natural capacity to absorb and neutralize aqueous and solid wastes and to revegetate themselves. The levels of social costs are a function of mine location in relation to pre-existing land rights, commercial and agricultural activities, community infrastructure and population centres.

173. Rule of thumb estimates of the company costs associated with implementing current environmental standards in the industrialized countries might be well beyond the reach of many small commercial mining operations proposed for the developing countries, to say nothing of their financial capacity to internalize any social costs. For small to medium mines, permitting can run about 5 per cent of the project's total estimated investment cost; compliance another $30,000 to $100,000 per year; while initial reclamation bonding may cost as much as $1 million, with site-specific reclamation about $3,500 per acre. On the other hand, the costs of establishing workable permitting, oversight and enforcement mechanisms within Governments may be equally burdensome. The solution for both small industrial operations and Governments may be to scale down expectations in certain areas. For example, small industrial operations employing contemporary scaled-down mining and processing technology, for example, mechanized surface mining and cyanide heap leaching

/...

of gold ores, face the same environmental problems posed by their use at the larger scale. The mitigative measures required will be similar, but if permitting procedures remain simple and rehabilitation objectives reasonable, additional design and operating costs may be manageable. Less onerous solutions to reclamation financing than the reclamation bond will also have to be identified, such as the establishment of trust funds that allow reclamation costs to be accumulated over the active life of the mine.

C. Technology available

174. At the artisanal level, technologies, techniques and mining strategies now exist that would allow for the mitigation, if not even the elimination, of many environmental hazards and impacts. For example, the loss of mercury to the environment during gold amalgamation and the hazards associated with its use can be greatly reduced by making modest adjustments to sluicing practice, by using closed system amalgamating barrels and retorts. Backfilling of abandoned pits with overburden and waste removed from new pits allows reclamation to occur during the mining cycle, as well as the elimination of a safety hazard. Simple diversion, drainage ditch and catchment systems can facilitate the recirculation and conservation of water during sluicing, as well as reduce sediment loading of nearby rivers.

175. However, the introduction of even simple innovations to mining practice and technology do not always take hold. Low-cost retorting technology for mercury recuperation has been made available to artisanal gold-miners in a number of countries, but has been ignored or misapplied. Even in carefully planned, phased introductions, its adoption has been resisted. The availability of appropriate technology and its cost may not be the issue in such cases.

176. During the past decade, the introduction and spreading use of suction dredges, bulldozers, water monitors and trucks by garimpeiro syndicates and small companies for alluvial mining along the Amazon River systems has greatly accelerated the pace and degree of environmental degradation. Ironically, as the level of mechanization in alluvial operations increased, so too has the physical disturbance of river-beds and river-banks of natural drainage systems. Turbidity and sediment loading have also increased. The upscaling of artisanal operations without appropriate technical support and advice led to the exacerbation of environmental problems.

177. In the Andean foothills of Bolivia, a recent catastrophic mud slide buried the village and mine site of an organized gold-mining cooperative. The miners themselves may have inadvertently contributed to the hazard by having stripped the hillsides of trees and vegetation, thus increasing their susceptibility to slope failure during the rainy season. This was not a hazard that could not have been recognized or understood, given proper training or advice.

/...

178. In many situations, the possibilities for reducing environmental hazards and impacts resulting from mining operations may hinge as much on organizational, educational and political actions as on technology availability and cost. Where diffusion of new ideas, training and technologies has been confounded, alternative approaches may yet be required. To facilitate the controlled use of mercury, consideration could be given to premium purchasing arrangements and prices for unamalgamated gold or even amalgam before burning, since it is through vaporization that much of the mercury is currently lost, or to shared supervised concentrating and recovery facilities. For reclamation funding and ultimate implementation, the back-door approach of Ghana may prove to be most workable.

D. International funding sources

179. Given the current international climate, environmental protection and remediation efforts and projects should be one area where funding is not reluctantly provided. Although donor agencies and development banks talk more and more in environmental terms, they still seem hesitant to finance projects related to mining practice and environment. Environmental planning and project officers have little or no knowledge of the mining sector, and their mineral industry counterparts are still disposed to promote large mining projects and address related issues and themes.

180. In 1991, the United Nations Environment Programme (UNEP) produced a 116-page technical guide on the environmental aspects of metal mining, of which one and one half pages explicitly addressed artisanal concerns. Much of the rest of the document contained information of value to small mechanized mines. While in 1991 the International Labour Organisation (ILO) also produced a code of practice for safety and health in open-cast mines, advice for small mine operators was limited to the following warning:

> "Small mines (as defined by national laws or regulations) which do not, as individual mines, have sufficient resources to fulfil the requirements of this section of the code should pool their resources or make such other arrangements as to comply properly with the relevant requirements."

181. The strong objections expressed by organized labour representatives before the Fifth Tripartite Meetings of the previous year (1990) regarding the lack of minimal health and safety standards and exploitative income and work practices that still characterize much uncontrolled, unmonitored artisanal activity have yet to be formally addressed. While recognizing and reaffirming the value and importance of the informal sector, the conclave called on member States and employers' and workers' organizations to find ways of improving the efficiency, productivity, safety and environmental sensitivity of informal subsector mining operations, as well as ways of providing basic social and economic infrastructure to mining communities where they may be lacking. International technical assistance agencies concerned with the various aspects of mining practice in the developing countries must finally be prepared to turn their attention to help in clarifying and resolving environmental and social impact issues and problems affecting the subsector.

/...

182. During the past few years, private contributions to almost all charitable organizations have fallen, except to those involved in environmental activism. Another potential source of funding and collaborative assistance on project themes of mutual concern and interest are those charitable foundations and organizations with an international outlook and environmental mandate.

VIII. CONCLUSIONS

183. Artisanal mining should be rationalized and, in the developing countries, strengthened for its contribution to rural economic and social development.

184. Identification of deposits and areas amenable to small-scale mining and their economic and technical viability should be carried out by Governments with assistance from outside agencies, if necessary. Access to prospective ground should be guaranteed and security of tenure should be respected in such areas.

185. The innate prospecting potential of the artisanal miner to locate new large deposits should be preserved and transferability of title permitted under certain conditions.

186. Local and international non-governmental organizations can become the most effective entry for action at the grass-roots level. For the development of commercial mechanized small mining industries, national Governments should define and implement appropriate and supportive legal contexts and promote the upgrading or transformation of artisanal mining wherever possible.

187. Local capital shortage for initial financing of mine development, equipment and working capital always exists in this subsector and therefore mechanisms that promote reinvestment of local capital resources should be implemented. Similarly, debt or equity capital from external sources and foreign equity funds are difficult to secure. But alternatives have emerged, such as development banks financing at the regional level; consortia financing arrangements with other development organizations; the establishment of small revolving funds administered by local non-governmental organizations; and international charitable and religious organizations involved at the grass-roots financing level.

188. International donor agencies that can also assist in this role are available but efforts have been limited to medium and large ventures. Small investment opportunities must be identified, developed and promoted to attract foreign interest and funds. Governments should sensitize international donors to small-scale mining opportunities and needs.

189. The viability of small-scale mining depends on whether the product is marketed. Free-market arrangements will be required and ways must be found to bring buyers closer to mines. Fabrication ventures for value-added activities must be encouraged.

/...

190. Training to date has been sporadic. Structured programmes to increase skills and knowledge at all levels are needed. The establishment of demonstration mines and support services in designated mining areas will serve to attract artisanal activity and minimize their haphazard spread.

191. The participation of women in small-scale mining is increasing. National initiatives must be taken to identify, understand and neutralize constraints on women's ability to participate in new opportunities. The information gap should be addressed and measures taken to facilitate the design and implementation of pro-active strategies, policies and programmes at the national level.

192. Environmental and social risks of small-scale mining continue to exist, especially in "mineral rush" conditions which cannot always be anticipated or controlled. These must be normalized and activities diverted to designated areas where possible.

193. Environmental standards and regulatory procedures in formalized artisanal and commercial activity should not just be simply transferred from the industrialized countries. Regulations should be formulated to secure the integrity of the workplace and increase the level of regulation and mitigation efforts as the economic viability of mining is established. Alternatives to the use of hazardous chemicals and procedures must be evaluated and tested in the field.

194. The foreign-based private sector can play a vital role in promoting the small commercial mining industry. Although just their presence in a developing country can have a positive influence by attracting other foreign interest, their cooperation can include joint ventures with local entrepreneurs, provision of ancillary supplies and services, complementary work and marketing relationships with local small-scale producers, lending expertise to Government and producers, and returning marginal or small deposits to the national inventory. Not least is the possibility of sponsoring demonstration projects, training programmes, mining schools, small miner awards and completions.

195. The conclusions presented here are offered as a basis for discussion so as to enable the Committee to delineate the priority areas for future action related to small-scale mining. In view of the continuing importance of small-scale mining in the developing countries, the increasing role of women in mining, the need to monitor and implement environmental controls, and the increasing importance of industrial minerals, agro-minerals and mineral-based construction materials in an increasing population boom in the world, the Committee may wish to keep under review the opportunities and efforts to stimulate the subsector. Artisanal mining should be rationalized and, in the developing countries, strengthened given its contribution to rural economic and social development, where it has proved to be vital for the continued survival of rural communities facing drought and economic recession.

UNITED
NATIONS

E

Economic and Social Council

Distr.
GENERAL

E/C.7/1993/12
24 February 1993

ORIGINAL: ENGLISH

COMMITTEE ON NATURAL RESOURCES
First session
29 March-8 April 1993
Item 13 of the provisional agenda*

PRIORITY PROGRAMMES FOR COORDINATED ACTION BY THE UNITED NATIONS SYSTEM IN THE AREA OF MINERAL RESOURCES

Proposal for a mechanism to monitor and gather information on a regular basis on issues concerning the flow of investment in the mineral sector of developing countries and capacity-building in investment promotion

Report of the Secretary-General

SUMMARY

Mineral exploration and development activities in developing countries have stagnated or declined and if they are to be revitalized finance is of crucial importance. To this end, developing countries will have to rely on substantial commercial financial flows, in the provision of which foreign direct investments (FDI) will play an increasingly important role. Developing countries are now taking a different and more positive view of the role that FDI can play in their economic and social development programmes.

With rapidly changing patterns of FDI in the mineral sector and with policy environments with respect to FDI in host developing countries being modified, a periodic review and analysis of such developments would promote awareness in developing countries of these changes. Knowledge of the patterns and flows of FDI would greatly assist in the formulation of the most suitable and efficient policies on the part of countries seeking to attract FDI in the development of their mineral resources. Such a monitoring system could also address problems concerning the statistics and definition of FDI in the mineral sector.

---

* E/C.7/1993/1.

The key factor in attracting and holding FDI is the creation and maintenance of conditions conducive to productive foreign investment. In addition, developing countries will need to build their capacity in investment promotion, because investment opportunities in developing countries may remain unused if potential investors do not receive adequate and timely information.

CONTENTS

	Paragraphs	Page
INTRODUCTION	1 - 7	4
I. EXISTING FDI MONITORING AND DATA-COLLECTION MECHANISMS FOR DEVELOPING COUNTRIES	8 - 13	5
II. INVESTMENT TRENDS IN THE MINERAL SECTOR	14 - 24	10
III. PROPOSED MONITORING SYSTEM	25 - 26	14
IV. CAPACITY-BUILDING IN INVESTMENT PROMOTION	27 - 30	14
V. CONCLUSIONS	31 - 32	16

/...

INTRODUCTION

1. Mineral sector investment patterns in developing countries have changed significantly since the latter part of the 1980s, with foreign direct investments (FDI) becoming the major source of funding. In view of this development, FDI will be particularly emphasized in the review and monitoring of investment flows in the mineral sector of the developing countries.

2. For the large majority of developing countries, FDI, official development assistance (ODA) and private bank lending are the major external sources of investment resources. Particularly in mineral resources development, which is a capital-intensive industry dependent on regular investments from private and public sources, foreign direct investment has become the single most important source of funding in developing countries.

3. For the purposes of this report, FDI inflows are the utilized amounts of foreign capital and the reinvested earnings in wholly or majority foreign-owned enterprises, equity joint ventures, contractual joint ventures and exploration projects for mineral resources.

4. After heated debates during the late 1960s and early 1970s on such issues as control over key natural resources and manufacturing industries, numerous developing countries imposed restrictions on FDI. Moreover, after the mid-1970s the phenomenal growth of bank lending to developing countries, primarily by development banks, largely overshadowed FDI in the developing countries.

5. However, the post-1982 debt crisis, the sharp decline in voluntary bank lending and the acute balance-of-payments problems faced by many developing countries have led developing countries once again to take an active interest in foreign corporate investment. Many developing countries have liberalized restrictions on FDI in order to attract new flows of FDI, especially FDI-related foreign exchange flows. FDI is also seen as a source of vital real assets, such as technology, enhanced access to international export markets and management skills, all of which are required to revitalize industrial capital formation and to achieve economic growth.

6. With significant changes taking place in investment patterns in mining, especially with new geographic regions, mineral commodities and types of projects coming into favour, developing countries will require a global overview of FDI in mineral resources development to assist them in the assessment and development of policies to attract FDI in their mineral sectors. The available national FDI statistics, particularly for the mineral sector, show a lack of comparability between countries. There is a need to harmonize these statistics with accepted definitions, in order to provide an improved overview of FDI in mineral resources development. 1/

7. Assessment of global trends in mineral resources development, especially FDI inflows, would promote awareness among developing countries of the need to create reasonable conditions and/or improve their investment and fiscal framework to attract FDI. Clearly, government funds and those provided by multilateral and bilateral cooperation agencies for mineral resources

/...

development are limited. Moreover, in many developing countries national resources for investment are very limited and given the competing demands on these scarce resources, Governments cannot afford to invest in the mining sector with its attendant risks.

I. EXISTING FDI MONITORING AND DATA-COLLECTION MECHANISMS FOR DEVELOPING COUNTRIES

8. FDI data are usually reported in national accounts statements and in local currencies, which more often than not leads to distortion in FDI data. Exchange rates can distort FDI data if inflation is high or if the true value of the currency is not reflected by exchange rates. In a number of developing countries FDI data are not available.

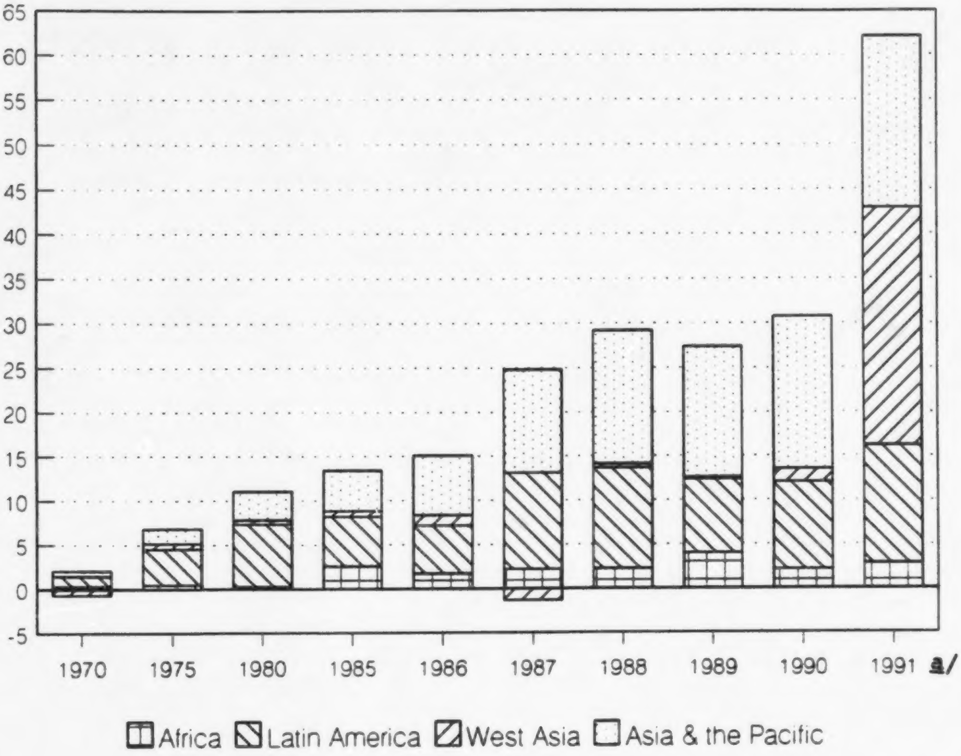
9. In many developing countries sectoral coverage of FDI data is very limited or the classifications followed by the national reporting bodies are incompatible with international standard classifications. As a consequence there is little credible direct data on FDI in the minerals sector and, even more important, there is a lack of comparability between countries.

10. This lack of comparability is due to discrepancies between total outflows and total inflows, because countries differ in their definitions of FDI. Further, when FDI is recorded, countries differ in their methods of data collection and in their corporate accounting practices and valuation methods. Often there is an overstatement of investments as a result of the organization of FDI flow data, especially in cases where funds are channelled through holding companies. Also, the location of the holding companies gives rise to major problems in the compilation of accurate geographical or sectoral distribution of FDI, because the ultimate host country and ultimate investing country become obscured.

11. Total FDI inflows to developing countries have increased significantly during the latter half of the 1980s (see figure 1 below) and the countries of the Asia and Pacific region have become the largest recipients of FDI, especially the newly industrializing higher-income South-East Asian countries. Africa has received a relatively small amount of FDI and although FDI inflows to Africa increased towards the end of the 1980s, they have been in decline since 1990. In Latin American countries the contraction in FDI inflows towards the end of the 1980s, primarily on account of the debt crisis and the problems to which it gave rise, has apparently been reversed. It is noteworthy that, since early 1992, Chile and Mexico have become the major recipients of mining investments. 2/

Figure 1: FDI inflows to developing countries, by region

(Billions of United States dollars)



Source: United Nations, Department of Economic and Social Development, based on data collected by the Transnational Corporations and Management Division.

a/ The anomalous increase in FDI inflows to West Asia in 1991 reflects the financing of rehabilitation and reconstruction in those countries directly involved in the Asian Gulf crisis.

12. The leading factors influencing the continued growth of interest by foreign investors in the Asia and Pacific region are apparently trade and economic growth, quality of human resources, adequate infrastructure and the availability of natural resources. Resource-based export-oriented operations are a leading area of involvement by foreign investors and the mineral sector continues to attract FDI, especially in key producing countries. FDI share in mineral resources development in developing countries, where the data are available, are shown in the table below, based largely on national sources in current prices and local currencies, as well as in United States dollars wherever possible. The data are shown by sector, the primary sector consisting of mining and quarrying data and the secondary sector and subsectors of metal and non-metallic mineral production data. The table clearly illustrates the scarcity of and deficiencies in the data.

13. It is obvious that to achieve enhanced comparability between countries, FDI data should be expressed in a common currency, in United States dollars and ideally in real terms, since exchange rates fluctuate widely and some currencies have been devalued considerably. FDI data are published by a variety of national institutions and the data provided by those institutions are typically the foreign investments approved rather than the investments actually implemented. More often than not sectoral disaggregation of FDI is available for approved amounts only, which are usually larger than those actually implemented. More complete FDI data in the mineral sector could be achieved through a company survey to obtain additional information on components of FDI not covered in foreign exchange records of central banks, which are limited in details, particularly reinvested earnings. Central banks could also require additional information from foreign investors to supplement the data on FDI flows collected primarily for balance-of-payments purposes.

Table 1. FDI in mineral resources development, 1977-1990

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Asia and Pacific region														
China (millions of yuan)														
Primary	..	..	..	..	..	..	..	..	1 060.9	..	..	6.1	..	..
Secondary	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Fiji (millions of Fiji dollars)												..		
Primary	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Secondary	..	..	..	..	..	..	..	..	1.2	1.4	..	..	3.7	..
India (millions of rupees)														
Primary	10.0	1.0	14.0	..	..	..	..	..	..	..	..	..	..	..
Secondary	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Indonesia (millions of United States dollars)														
Primary	..	..	..	..	..	..	..	..	..	..	121.5	225.6	82.9	219.7
Secondary	..	..	..	..	..	..	..	..	..	..	382.6	239.2	18.7	59.0
Malaysia (millions of ringgit)														
Primary	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Secondary	..	..	..	..	..	..	..	..	170.5	833.5	1 300.6	5 023.8	..	..
Africa														
Egypt (millions of Egyptian pounds)														
Primary	..	..	..	..	..	..	..	..	..	..	..	0.2	..	..
Secondary (metals)	..	..	..	..	..	..	..	..	..	..	..	63.2	..	..
Secondary (non-metallic)	..	..	..	..	..	..	..	..	..	..	..	32.6	..	..
Ghana (millions of United States dollars)														
Primary	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Secondary (metals)	..	..	..	..	..	..	..	..	..	11.2	7.2	7.0	1.3	..
Secondary (non-metallic)	..	..	..	..	..	..	..	..	..	1.1	5.8	0.1	2.5	..
Morocco (millions of Moroccan dirhams)														
Primary	..	..	..	..	..	..	..	..	..	25.3	0.1	18.9	..	..
Secondary	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Nigeria (millions of naira)														
Primary	..	..	..	..	..	..	..	191.0	42.0	1 766.0	(-249.8)	..	..	..
Secondary (metals)	..	..	..	..	..	..	..	20.9	(-2.2)	23.7	0.8	..	..	..
Secondary (non-metallic)	..	..	..	..	..	..	..	(-14.4)	33.5	144.1	4.3	..	..	..
Zambia (millions of Zambian kwacha)														
Primary	..	..	..	4.7	(-66.8)	1.6	0.9	..	..	..	..	..	..	..
Secondary	..	..	..	..	..	..	..	..	..	..	..	..		

Table 1 (continued)

	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Latin America (millions of United States dollars)														
Argentina														
Primary	..	..	..	..	..	..	..	..	1.8	..	..	..	5.43	..
Secondary (metals)	..	..	..	..	..	..	..	..	..	..	..	..	2.59	..
Secondary (non-metallic)	..	..	..	..	..	..	..	..	..	..	..	..	9.19	..
Bolivia														
Primary	..	..	..	..	..	..	..	..	2.15	1.93	..	..	24.95	19.9
Secondary (metals)	..	..	..	..	..	..	..	..	..	..	..	..	1.27	..
Secondary (non-metallic)	..	..	..	..	..	..	..	..	..	..	..	..	..	2.07
Colombia														
Primary	..	..	..	..	..	..	..	..	440.29	371.98	324.87	2.09	100.99	48.3
Secondary (metals)	..	..	..	..	..	..	..	..	0.57	(-4.04)	1.02	0.24	5.26	(-0.52)
Secondary (non-metallic)	..	..	..	..	..	..	..	..	5.37	6.36	3.69	2.32	6.44	(-0.98)
Ecuador														
Primary	..	..	..	..	..	..	..	..	0.4	3.6	6.8	2.4	1.5	1.3
Secondary (metals)	..	..	..	..	..	..	..	..	2.0	0.1	0.9	1.4	3.6	0.9
Secondary (non-metallic)	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Peru														
Primary	..	..	..	..	..	..	..	..	4.28	3.09	0.18	2.32	3.57	0.37
Secondary (metals)	..	..	..	..	..	..	..	..	0.79	0.49	0.43	0.26	..	..
Secondary (non-metallic)	..	..	..	..	..	..	..	..	0.38	0.29	0.02	0.9	0.58	0.65

Source: United Nations, Department of Economic and Social Development, based on data collected by the Transnational Corporations and Management Division.

/...

II. INVESTMENT TRENDS IN THE MINERAL SECTOR

14. Although there was a rapid increase in FDI flows in aggregate in the 1980s, it was accompanied by a transformation in the sectoral composition of both the flows and stocks of this investment. There was less concentration in raw materials, other primary products and resource-based manufacturing.

15. In the mineral sector, changes in the policies of many developing countries in the 1970s regarding the ownership of their natural resources was a factor in the decline of FDI in the sector. Moreover the depressed long-term price outlook since the 1980s resulted in relatively few mining projects being developed. Many mining companies were either reluctant or unable to undertake significant new equity investments in developing countries. As a result of rapidly rising investment costs, accompanied by declining rates of global demand for most basic mineral products, world market prices for many minerals hit their historically lowest levels in real terms.

16. The dominance of transnational mining companies in mineral activities in developing countries through traditional FDI has been declining since the 1960s. Several factors contributed to the decline: sharp increases during the 1960s in the host country taxation of foreign-owned mining operations; the partial or complete nationalization of these activities through the mid-1970s; the widespread growth of State mining enterprises since the early to mid-1970s; and most important, the change which occurred in the principal mode of financing mineral sector investments, loan financing practically superseding foreign equity financing.

17. Nevertheless, despite the above-mentioned transition, there has been a marked increase in new forms of international financial flows in mining and mineral processing industries of developing countries, with international loan finance linked to the purchase of mineral products; the supply of equipment; the provision of management and technical services by foreign companies; and the supply of technology through turnkey contracts, licensing and other contractual forms. In addition, lenders required that project development and initial operations be carried out by experienced foreign mining companies, thus retaining their influence.

18. It should be noted that the State mining companies of such countries as Brazil, Chile, China, Mexico, Morocco and India had developed their managerial and technical expertise to the point that foreign companies' involvement through loan financing in these countries was until recently largely to facilitate access to international export markets and/or to international financial markets. However, most of these countries have since opened their mineral sectors to foreign investment.

19. The principal forms of foreign investment in the mining and mineral processing industries in developing countries are: wholly or majority owned subsidiaries, joint ventures, licensing arrangements, management contracts and international subcontracting. Recently, most of the larger mining and mineral processing development projects have been operated under the international subcontracting system, in which the mining project (nominally under the control of a State mining concern) supplies the required funds and hires a contractor for specific tasks. The required funds are obtained through foreign credit

/...

institutions, the World Bank (primarily through its affiliate, the International Finance Corporation), regional development banks and export-credit agencies. These financial institutions usually assert considerable control over operations, including choice of contractors. 3/

20. The major factors that led to the changing balance between the various forms of foreign investment in mining and mineral processing industries in developing countries were the global demand trend for mineral products, mineral prices, the financial situation of major mining companies and host government regulations.

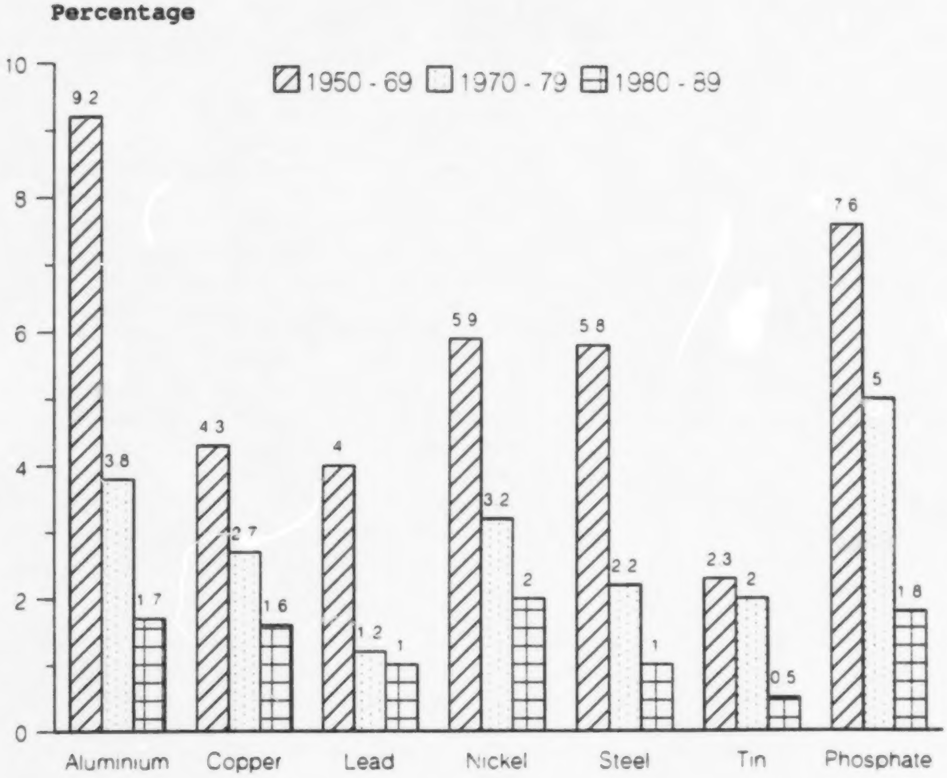
21. During the 1970s the rate of growth of global demand for most basic mineral products declined and in the early part of the 1980s demand stagnated or even turned negative. Figure 2 shows the average rates of growth of global demand for some of the key basic mineral products. Demand for most of these mineral products continues to be adversely affected by technological developments and by substitution with new materials. The changes in demand conditions are apparently not just the result of downturns in the business cycle but of more fundamental changes in long-term demand conditions.

22. The sharp rise in metal prices in 1988, following severe declines from 1980 through 1986, is a reflection more of volatility than of renewed stability of prices in the future (see figure 3). Depressed long-term market conditions and volatility in prices are the major causes of the marked deterioration in the financial position of the major mining companies, which has been exacerbated by the rising taxation of foreign-owned mining operations as the Governments of developing countries sought to increase their share of mining rents, especially during the 1970s.

23. With the adverse changes made by developing countries in the regulations for foreign investments in the mining sector it became progressively harder in the early to mid-1970s for transnational mining companies to obtain the favourable conditions for direct investments which had formerly prevailed, all the more so as countries became more aware of the terms and conditions negotiated by other countries. Meanwhile, due to the exposure of many developing countries to a high level of debt-related financial risk, and in some cases a high level of political risk as well, new investment tended to shift away from those countries. During that period only a few countries, such as Brazil and Papua New Guinea, continued to attract foreign equity capital.

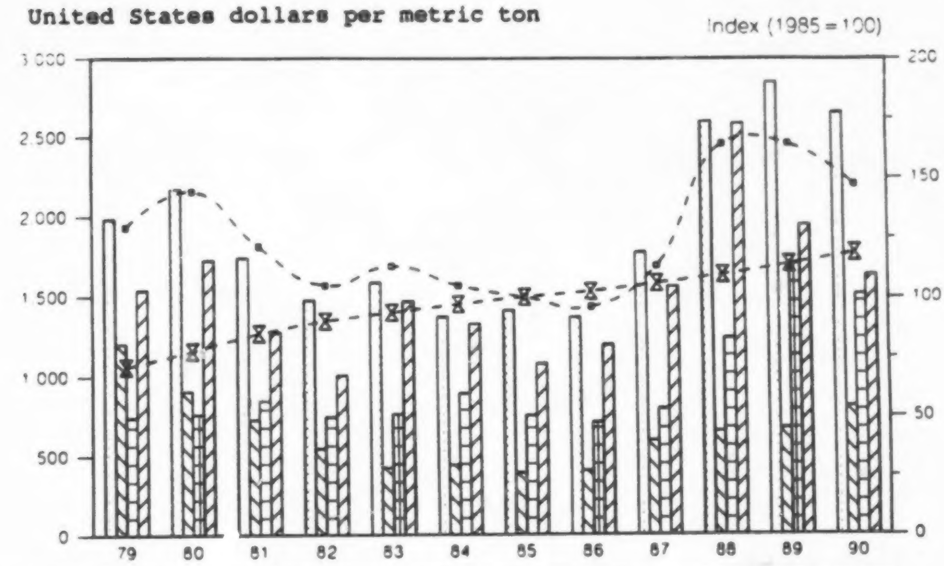
24. However, with loan financing (a combination of loans at concessionaire and commercial rates) superseding foreign equity financing as the principal mode of financing mineral sector investments, many developing countries became saddled with huge debt burdens as they had to assume major risks and costs, particularly countries with limited mining experience and those that depended heavily on the mineral sector for a large part of their foreign and local fiscal revenues. As a result, and especially after the 1982 debt crisis and the growing scarcity of loans even under project financing arrangements, several mineral producing developing countries began to actively promote FDI in the development of their mineral resources.

Figure 2. Average annual growth rate of world consumption of primary major metals and minerals



Source: United Nations, Department of Economic and Social Development, based on UNCTAD Commodity Yearbook, various issues.

Figure 3. Metal prices (London Metal Exchange cash settlement)



	79	80	81	82	83	84	85	86	87	88	89	90
Copper	1.984 4	2.173 4	1.742 1	1.480 3	1.592 1	1.377 9	1.417 5	1.373 8	1.781 4	2.600	2.846 7	2.660 8
Lead	1.203 4	906 8	727 1	545 8	425 6	443	391 1	406 2	596 9	653 3	673 4	810 6
Zinc	741 4	761 6	846 5	744.7	764 7	895.7	755 6	712 2	798 9	1.241 5	1.713 5	1.518 9
Aluminium	1.541 1	1.728 3	1.277 6	1.006 9	1.473 9	1.332 7	1.081	1.198	1.565 6	2.586 8	1.951 3	1.639 4
Metal prices index	129	144	121	105	113	105	100	96	113	164	164	147
US GNP deflator	70 8	77 3	84 7	90 1	93 6	97 2	100	102 5	105 8	109 4	113 8	118 5

☐ Copper ▧ Lead ▥ Zinc ▨ Aluminium -•- Metal prices index a/ -⧗- US GNP deflator

---

Source: United Nations, Department of Economic and Social Development, based on UNCTAD Commodity Yearbook, 1991; International Monetary Fund, Primary Commodities, July 1990; and International Monetary Fund, International Financial Statistics Yearbook, July 1992.

a/ The weights in metal prices are: Cu 26%; Al 20%; Fe ore 19%; Sn 10%; Ni 8%; Zn 6%; Pb 5%; PO_3 rock 6%.

III. PROPOSED MONITORING SYSTEM

25. It is proposed that a monitoring system for FDI in the mineral sector in the developing countries be established. This system would essentially consist of a statistical overview with as much detail and standardization as possible of the financial inflows in their various forms, including traditional foreign investment (whole or majority foreign ownership); international subcontracting, such as management and/or technology contracts; joint ventures; and production sharing and risk-service contracts. The objective of this system would be to achieve an enhanced perspective of patterns of FDI in the mineral sector, leading to a better understanding of factors influencing foreign investors in making decisions on the location of their investments. An analysis of the various factors at play would assist in the formulation of the most suitable and efficient policies by host developing countries seeking to attract FDI in the development of their mineral resources.

26. The monitoring system could also include a review of mining investment potential, particularly that of developing countries with little or no reception of FDI in the mineral sector. The regulatory framework for FDI in the mineral sector should also be monitored, since the degree of openness to foreign investors varies considerably among developing countries. Many countries have amended their legislation and tax regimes in order to facilitate liberalization of FDI for the development of individual industries, transfer of technology and enhanced exports. Other factors of importance in attracting FDI are overall macroeconomic policies, the degree of infrastructure development and the political stability of the host country. Competitive strategies are continually evolving world wide, with shifts in the division of risks, responsibilities and rewards among foreign investors, Governments, international lending institutions, commercial banks and local investors. A periodic review of these developments would be most informative and useful, if not indispensable, for the majority of developing countries.

IV. CAPACITY-BUILDING IN INVESTMENT PROMOTION

27. It is essential that developing countries have the capability to evaluate and develop their mineral resources efficiently, and in their quest for FDI special attention should be given to the creation and maintenance of conditions conducive to productive foreign investments. Developing countries are increasingly required to focus on the regulation and promotion of mineral resources development, especially in view of the keen competition for financing mineral development projects, given the increasing number of countries offering interesting projects. Countries of the Commonwealth of Independent States, central and eastern Europe and many of the developing countries that were hitherto closed to foreign investments in mineral development projects, as well as countries which are already established mining locales, are all becoming more aggressive in seeking investment capital.

28. The strengthening of national capacities should embrace such elements as:

(a) National geodatabase: geological knowledge of the country and its mineral deposits is crucial. Improved geological knowledge reduces technical uncertainties and provides the parties with a better basis for negotiating a

/...

fair and long-lasting agreement. It is the responsibility of the Government to supply basic geological data of quality (geological and structural mapping and grass-roots exploration), without which necessary detailed exploration surveys and further development activities will not be possible. It is this data which initially attract legitimate mining companies;

(b) Mining legislation and fiscal regime: a mining code should be established to provide a legal framework which defines the relations between the investor and the Government. It should cover the conditions for investment, land tenure, rights and obligations of the operator, as well as investment and tax provisions. Without a stable legal and fiscal regime, it is difficult for potential investors to know the long-term prospects for mining activities in the country. A mining code would also enable the country itself to ensure a legal regime which applies to all investors equally;

(c) Institutional strengthening: in order to properly implement and maintain the legal/fiscal regime and to ensure an efficient appraisal and monitoring process of the mining sector, an efficient administrative framework is required. Very often inefficient bureaucratic processes are an impediment to investment, since delays become costly to proposed projects. Thus, it is imperative that institutional matters be addressed along with legislative/fiscal innovations;

(d) Information flows: the availability of adequate information on basic geological data and legislative, economic and fiscal matters are prerequisites for sound planning and decision-making for mineral development, for both Governments and foreign investors;

(e) Training and employment and transfer of technology: mineral exploration and development must be accompanied by adequate provision both for the training and employment of nationals in all aspects of the programme and for the transfer of technology;

(f) Infrastructure policy: often the infrastructure available to support mineral development is poor. Severe capital constraints are the norm in most developing countries and thus mining companies often have to build their own infrastructure. Governments need to plan infrastructure requirements if they are to support mineral development.

29. Revenues from mineral production can contribute significantly towards economic and social development of developing countries, but in many cases knowledge of their mineral resources is often limited. Most developing countries, given their limited resources and the competing demands upon these resources, cannot afford to invest in the risky business of mineral exploration. There are significant exploration gaps in developing countries. Foreign mining companies are understandably reluctant to undertake any ventures without some indication of the existence of significant occurrences of minerals of special interest to them.

30. It is clear that a large majority of developing countries themselves are unable to take the necessary first steps in a mineral exploration programme. Substantial assistance from both bilateral and multilateral sources is necessary to enhance the efforts of those developing countries in the

development of their mineral resources. Multilateral programmes are perhaps better suited for large mineral exploration projects because of their professional and global nature, apart from the fact that foreign mining companies do not undertake them.

V. CONCLUSIONS

31. There is a critical need for more accurate FDI data and related information in the mineral sector, because there is a lack of comparability between countries. Comparability of information would be more effective for public sector decision makers in their deliberations on the most suitable and efficient policies developing host countries can adopt to attract FDI for the development of their mineral resources. To attract FDI requires the preparation of a mineral sector development strategy, the conscious determination of a host country to implement this strategy and good administration.

32. As developing countries are more actively seeking new inflows of FDI, and considering the above-mentioned need for credible FDI data, the Committee may wish to consider a mechanism to monitor and gather information on a regular basis on issues concerning the flow of investment in the mineral sector and capacity-building in investment promotion.

Notes

1/ World Investment Director 1992 (United Nations publication, Sales No. E.92.II.A.11), vol. 1, chap. II.

2/ International Direct Investment and the New Economic Environment (Paris, Organisation for Economic Cooperation and Development, 1989).

3/ New Forms of Investment in Developing Country Industries (Paris, Organisation for Economic Cooperation and Development, 1989), chap. 2.
